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NAME OF AUTHOR/*NOM DE L'AUTEUR* CLAUS A. HALLSCHMID

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NAME OF SUPERVISOR/*NOM DU DIRECTEUR DE THÈSE* DR. GEORGE FITZSIMMONS

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INTRINSIC MOTIVATION: THE EFFECTS OF TASK CHOICE, REWARD MAGNITUDE AND REWARD CHOICE

by

© CLAUS A. HALLSCHMID

A THESIS

SUBMITTED TO THE FACULTY OF GRADUATE STUDIES AND RESEARCH

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The undersigned certify that they have read, and recommend to the Faculty of Graduate Studies and Research, for acceptance, a thesis entitled "INTRINSIC MOTIVATION: THE EFFECTS OF TASK CHOICE, REWARD MAGNITUDE AND REWARD CHOICE," submitted by CLAUS A. HALLSCHMID in partial fulfillment of the requirements for the degree of Doctor of Philosophy.

Geo. H. Simmons
Supervisor

John Osborne

R. Mulcahy

Charles H. Lee

Michael Ross
External Examiner

12 August 1977
Date

ABSTRACT

Attribution theory proposes that the larger an extrinsic monetary reward the more likely the subject's attention will become focused on that reward (Lepper & Greene, 1976). A second proposition is that any externally imposed condition (i.e. deadline, reward choice) will also result in a perceived shift in locus of causality to the external condition. In the present study both the effects of a larger versus a smaller monetary reward and the effects of reward choice on subsequent intrinsic motivation were investigated. More speficically, the present study examined the effects of individually determined task choice, reward magnitude, and reward choice on subsequent intrinsic motivation. Three seperate studies were conducted.

The first study was designed to (a) establish a behavioral norm of intrinsic motivation on five experimental task, (b) to allow comparison of this norm to high and low task motivation levels determined by means of a paired-comparison procedure, and (c) to test the relationship between additudinal measures and a behavioral measure of intrinsic motivation. The results indicated first that although high and low task choice did not differ significantly on the behavioral measure from the previously established norm the two motivational levels did differ significantly from each other in opposite directions from the norm. This established the validity of the paired-comparison procedure to provide individually determined

levels of intrinsic task motivation. Secondly, the various self-report measures showed only a moderately low correlation with task persistence. Furthermore, a factor analysis indicated that the attitude measures may not be part of the same factor structure as the behavioral measure.

The second study explored the effects of pre-testing on both behavioral and attitudinal measures of intrinsic motivation. The results indicated that two of the attitude measures were significantly affected by pre-testing. However, the task persistence measure remained relatively immune to any pre-test effects.

The third study tested the effects of reward magnitude and individually determined monetary reward choice on subsequent intrinsic motivation for a task by manipulating both intrinsic task motivation and extrinsic reward as independent variables. In two reward conditions subjects were given a high ($2,00) and a low (25¢) monetary reward for working on an experimental task of either high or low perceived intrinsic motivation for a 10-minute period. In a third condition subjects were allowed to choose the monetary reward at the end of this 10-minute period. Their subsequent intrinsic task motivation, defined as task persistence, was measured unobtrusively during a second 10-minute free-choice interval and compared to high and low motivation control groups. The results showed that reward magnitude was not, but that individually determined reward choice was, significantly related to subsequent impairment of intrinsic task motivation. These findings were discussed in relation to both attribution theory and some alternative theoretical explanations.

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TABLE OF CONTENTS

Page

I INTRODUCTION 1

II REVIEW OF THE LITERATURE 6

THEORITICAL FORMULATIONS 6

Cognitive Evaluation Theory 7
Attribution Theory 8
The Concept of Behavioral Justification 10
Inequity Theory 13
The Competing Response Hypothesis 15

EVALUATION OF THE THEORIES 17

SELECTIVE REVIEW OF THE EMPIRICAL LITERATURE 20

Early Studies Investigating the Hypothesized Shift in Locus of Causality 21
Contingent Vs Non-Contingent Rewards 23
Timing of Reward 23
Expectation of Reward 25
Task Performance and Task Intrinsic Motivation 28
The Content-Consequence Distinction 29
Negative Extrinsic Reward 29
Intrinsic and Extrinsic Motivation as Independent Variables 30
Reward Saliency 32
Performance Contingent Rewards 33
Non-Tangible Reward Conditions 35

EVALUATION OF EMPIRICAL RESEARCH 36

Reward Salience and Reward Magnitude 36
Reward and Task Choice 43
Dependent Measures of Intrinsic Motivation 45

III RATIONALE, DESIGN, AND HYPOTHESIS 48

RATIONALE 48

DESIGN 52

HYPOTHESIS 54

Individual Task Choice 55
Reward Magnitude 56

IV METHOD 58

SUBJECTS 58

Page

PILOT STUDY 58

STUDY 1 59

Procedure 60
Dependent Variable Measures 64

STUDY 2 65

Procedure 66
Dependent Variable Measures 67

STUDY 3 67

Procedure 68
Dependent Variable Measures 69

V INDIVIDUAL TASK CHOICE: RESULT AND DISCUSSION 70

RESULTS 70

DISSUSSION 73

VI TEST-RE-TEST EFFECTS: RESULTS AND DISCUSSION 76

RESULTS 76

DISCUSSION 78

VII REWARD MAGNITUDE AND REWARD CHOICE: RESULTS AND DISCUSSION 80

RESULTS 80

DISCUSSION 88

VIII CONCLUSIONS 100

REFERENCES 107

APPENDIX 1 112

APPENDIX 2 116

APPENDIX 3 122

APPENDIX 4 131

APPENDIX 5 139

APPENDIX 6 148

APPENDIX 7 157

LIST OF TABLES

Page

TABLE 1. MEAN TIME IN SECONDS OVER A 10-MINUTE FREE TIME PERIOD 83

TABLE 2. SUMMARY ANCOVA TABLE FOR TASK PERSISTENCE DATA: 2 (GROUPS) x5 (LEVELS) 84

LIST OF FIGURES

Page

FIGURE 1. MEAN VALUES IN SECONDS FOR REWARD CONDITION GROUPS 86

CHAPTER I

INTRODUCTION

Currently, we are witnessing an increasing interest in the theoretical issues surrounding the attributional analysis of motivation (Weiner, 1970; Weiner & Kukla, 1970). Attributional reformulations are generating research in a number of diverse areas ranging from skill-oriented performance tasks (Miller & Ross, 1975) and interpersonal influence studies (Beckman, 1973) to intrinsically motivated task performance (Kruglanski, 1975). With respect to intrinsically motivated task performance, de Charms (1968) originally concluded that different types of motivation are non-additive. That is, motivation to perform a task is not necessarily the greatest when an individual performs an activity both for its own sake and as a means to obtain a reward. This core hypothesis has generated considerable research on diverse aspects related to the hypothesized non-additive effects of extrinsic rewards on intrinsic motivation.

Lepper and Greene (1976) in an important conceptual paper provide strong argument for the heuristic and theoretical value of the distinction between two broad classes of motivation: extrinsic and intrinsic motivation. At the base of this internal-external partition is the assumption that a person is intrinsically motivated if he perceives himself performing an activity for no apparent reason except the activity itself (Deci, 1971). Extrinsic motivation on the other hand, refers to the performance of an activity because it leads to an external reward (e.g. status, money, verbal approval). Therefore intrinsic motivation is often equated with a uniqueness dimension for a particular individual, whereas external motivation is equated with non-uniqueness (Kruglanski, 1975). Although the operationalization of intrinsic and extrinsic motivation poses a problem some important issues have been raised with respect to the hypothesized non-additive relationship between the two.

Cognitive evaluation theory (de Charms, 1968; Deci, 1971) suggests that this non-additive relationship can be explained in terms of the individual's perception of what causes his behavior (Locus of Causality). That is, the association of an extrinsic reward to an already intrinsically satisfying task has the effect of changing the perceived locus of causality from internal to external and thereby reducing the motivation for the task. Therefore, the motivation to perform a task solely on the basis of its intrinsic task satisfaction will suffer if an extrinsic reward is introduced. The basic assumption is that we infer our beliefs from observation of our own behavior and the circumstances under which it takes place. The individual's perceptions of the causes of his behavior becomes the major unit of analysis in cognitive evaluation theory. It is assumed therefore, that if the person attributes his behavior to intrinsic factors that he then behaves as if he is intrinsically motivated and indeed we can say he is intrinsically motivated. Therefore, self-perceptions are assumed to have important implications for an individual's behavioir. Whatever the objective cause of behavior, if an individual perceives himself performing an activity for its own sake, he is likely to behave as if he were intrinsically motivated and conversely, if he perceives himself performing an activity for the external consequences attached to the activity he is likely to behave as if he were extrinsically motivated (Ross, 1976). Major emphasis is placed on what causes these perceptions, what modifies them, and what the behavioral consequences are once they are assumed.

In the empirical research most studies investigating this conceptualization use a similar experimental design -- an extrinsic reward is introduced to an already interesting task, and then one or more dependent variable measures of intrinsic motivation are assessed. Thus, a basal level of intrinsic motivation is determined, a treatment is given, and the post-experimental level of intrinsic motivation is measured. Measures of intrinsic motivation as dependent variable measures have included task persistence (Deci, 1971,1972a), willingness to participate in a similar experiment (Calder & Staw, 1975b; Kruglanski, Riter, Amitai, Margolin, Shabtai, & Zaksh, 1975), reported task interest and enjoyment (Deci, 1971; Calder & Staw 1975b), and free-time activity (Deci, 1971; Ross, 1975). However to determine the initial level of intrinsic motivation all of the studies to date have employed group validated task motivation level. That is, through pre-testing a task was equated on all dimensions except the affective dimension of perceived liking or enjoyment, which was manipulated as the independent variable. Within this paradigm Deci (1971) compared subjects who were paid to engage in an activity during the second of three work periods with control subjects who were not paid. Subjects who had been paid showed a greater decrease in performance from the first to the third period than control subjects. Apparantly, payment decreased the subjects' interest in performing the activity for its own sake. Calder and Staw (1975b) tested this hypothesized relationship more directly by manipulating both intrinsic and extrinsic motivation as independent variables and measuring the effect of their interaction on both task satisfaction and task persistence. The results revealed a significant decrease in intrinsic motivation in the presence of extrinsic reward when the initial level of intrinsic motivation was high. However this finding applied only to the task satisfaction measure not the persistence measure.

With respect to variables mediating this relationship, other studies have reported that several variables influence the interaction between extrinsic and intrinsic motivation: expectancy of reward (Deci, 1972b; Greene & Lepper, 1974; Kruglanski, Alon, & Lewis, 1972; Lepper, Greene & Nisbett, 1973), magnitude of task intrinsic reward (Kruglanski, Riter, Arazi, Agassi, Montiqio, Peri & Peretz, 1975), contingent versus non contingent rewards (Deci, 1972b; Kruglanski, Freidman & Zeevi, 1971), saliency of rewards (Ross, 1975a), perceptions of effective control (Karniol & Ross, 1975), delay of gratification (Ross, et al, in Press), and success contingent rewards (Ross, 1975b). Although most of these studies provide fairly consistent support for the hypothesis that intrinsic and extrinsic motivation interact non-additively, several issues and questions still remain untested.

The purpose of the present study is to investigate and test: (1) the effects of individually determined level of intrinsic motivation, rather than group validated motivation level, (2) establish a behavioral task norm of intrinsic motivation and determine whether individually determined task choice results in significant deviation from this behavioral norm, (3) determine the underlying factor structure of various measures of intrinsic motivation, and (4) test the effects of reward magnitude and reward choice (self-reward) on subsequent intrinsic motivation. Thereby, the present study addresses itself to a number of issues and untested predictions derived within an attributional framework.

CHAPTER II

REVIEW OF THE LITERATURE

THEORETICAL FORMULATIONS

The theoretical distinction between intrinsically and extrinsically motivated behaviors has introduced a number of theoretical issues. Generally these issues have centered around the conceptual criteria of internality and externality in motivation. The identification of intrinsic motivation with factors internal to the individual and extrinsic motivation with factors external to the individual seems to have brought a certain degree of confusion into the conceptualization of intrinsic versus extrinsic motivation. The theoretical relationship between these two classes of motivation is largely dependent on how internality and externality is conceptualized. To depict the nature of this relationship a number of speculative frameworks have been advanced. Common to these is the notion that the perception of the causes of behavior (self-attribution) plays a central role in the motivation process since the allocation of causal responsibility for behavior is assumed to guide subsequent behaviors. For example, the belief that an event is over-justifiably caused (more than one valid cause) may lead to different attitudes and actions than the belief that the event is justifiably (one valid cause) or underjustifiably caused (no valid cause).

Cognitive Evaluation Theory

de Charms (1968) has developed a phenomenological theory of personal causation predicated on the assumption that mastery of certain situations is valued for its own sake rather than the consequences it produces. Central to this conceptualization is the concept of personal causation. Calder and Staw (1975b) write:

> For the Charms, the crux of the distinction between intrinsic and extrinsic motivation stems from the feeling or perception of personal causation. Satisfaction derives from an activity which is perceived as intrinsically motivated because of a person's need to feel a sense of personal causation in his or her actions (p. 599).

de Charms also utilizes Rotter's (1954) concept of locus of control. However, he stresses the notion of instrumental feedback inherent in the activity whereas Rotter stresses the idea of reward as a consequence of the activity. Thus, the perception of the cause of behavior results in the feeling of being either an Origin or Pawn, depending on whether the locus of causality resides in the self or outside the self in the environment. When the locus of causality is perceived within the self, the individual considers himself to be intrinsically motivated (Origin). When the locus of causality is perceived outside the self in the environment, the individual considers himself to be extrinsically motivated (Pawn). Within this conceptual framework, extrinsic reward is thought to interact with intrinsic motivation by affecting a change in the perceived locus of causality with a subsequent change in feelings from

Origin to Pawn.

Deci (1971,1972a,1972b,1973), extending de Charms' theory further stresses the need for self-determination and competence in intrinsically motivated behaviors. He suggests that there are two processes by which extrinsic rewards can affect intrinsic motivation: a change in perceived locus of causality, and a change in one's feelings of competence and self-determination. These two processes are initiated at different times since every reward has two aspects: (1) a "controlling" aspect, which initiates change in the perceived locus of causality, and (2) an "information" aspect which provides knowledge to the person about his competence and self-determination. Which process is invoked depends largely on which aspect of the reward is more salient.

Attribution Theory

Kruglanski, et al (1975b) have taken issue with the above conceptualization of intrinsic motivation:

> The latter formulation has several implications; (a) its identification of intrinsic motivation with a specific need (reminiscent of the postulation of intrinsic and extrinsic needs by some industrial psychologists) removes the analysis from the original attributional level impartial to the type of motive; (b) it seems to misidentify internal attributions of causality with the need to make internal attribution (or the need of self-determination); (c) it seems to suggests that motives outside that of self-determination could not motivate activities in an intrinsic way (p. 745).

To deal with these issues Kruglanski, et al (1975b) adopt a purely attributional level of analysis. The crux of this theory is a content-consequence distinction. A person considers his behavior intrinsically motivated when he perceives the cause of his behavior to reside in the content of the task; a person considers himself extrinsically motivated when he perceives the cause for his behavior to reside in the consequences of a task. In terms of this content-consequence distinction, when an extrinsic reward is introduced to an already intrinsically rewarding activity, it is thought to change the perception of causality from content to consequence. Thus Kruglanski (1975a) redefines the internal-external dimensions:

> Let the term endogenous attribution of an action denote the case wherein an action is attributed to itself as a reason. In other words, an endogenousey attributed action is an end in itself .... Let the term exogenous attribution of an action denote the case where the action is not an end on itself but rather a means that mediates a further goal, one exogenous to it (p. 390).

As Kruglanski states, the conceptual criterion for this exogenous-endogenous distinction is relatively straightforward, as it is based on a common differentiation between means and ends. In contrast, the previously defined internal-external distinction (de Charms, 1968; Deci, 1971) does not provide a theoretically consistent means or criterion for designating the contingent monetary reward as the external cause of action.

Lepper (1976) and Calder and Staw (1975b), taking into account the effects of boundary variables , view the self-perception process in terms of positive, negative, or neutral affect associtated to various means and ends of an activity. Different self-perceptions, which subsequently guide behaviors, result depending on the nature of the affect associated to an activity or its consequences. Therefore, the individual considers himself extrinsically motivated when the ends of an activity are positive while the means are perceived as negative or neutral. On the other hand, the individual considers himself intrinsically motivated when the ends of an activity are perceived as negative or neutral while the means are perceived as positive. When both means and ends are perceived as positive an "unstable" attributional situation is created which may be resolved by a shift in the perceived liking or satisfaction attached to the task. This attribution process is hypothesized to be responsible for the reduced subsequent intrinsic task motivation.

The Concept of Behavioral Justification

Compliance research in the area of insufficient justification provides strong evidence that subjects will develop internal justification or control when there is insufficient external justification or control. Festinger and Carlsmith (1959), in their now classic study, found that subjects who received insufficient external reward ($1) grew to like the experimental task more than those who received sufficient rewards ($20). The insufficiently rewarded subjects developed internal justification, or a more favourable attitude toward the task.

On the other hand, in the cognitive evaluation studies, interesting experimental activities are employed allowing subjects to be sufficiently justified even when no rewards are given. Oversufficient justification occurs when a reward is given for an already interesting activity. Therefore, both reward and task justify the individual's behavior. As hypothesized in attribution theory, liking for the task and subsequent intrinsic motivation will decrease. Nisbett and Valins (1971) suggest that these two processes are not the same. Nonetheless, despite the fact that these two phenomena may have different underlying psychological processes, Deci (1972) suggests they still may be quite complementary.

Gerard, Connolley, and Wilhelmy (1974) in this tradition present a single-factor theory with which all the forced compliance research in both insufficient and oversufficient conditions is to be understood:

> The framework, depicts the relationship between "resultant justification" and both dissonance and "sweetness" effects on cognitive change. By resultant justification we mean the difference between all the various justifications for the complaint act and all the justifications (reasons) against performing it. Resultant justification is shown on the abscissa going from very low to very high levels. When the resultant justification for a given act (such as complying with the experimenter's request to taste bitter solutions) is very low, the person will not choose to engage in the act. For any given action alternative, there is some point at which resultant justification is just barely sufficient for the person to choose that alternative -- his "action" threshold. Dissonance-induced cognitive change will be maximum at this threshold. To the extent that

> resultant justification is greater than the minimum required to elicit the decision, dissonance will be lower. As we move along the abscissa to the right, we finally reach the "comfort" threshold, a point at which the relatively small amount of inconsistency can be tolerated with no accompanying tension to reduce it. This tolerance level is the individual difference variable we referred to above. Following to the right, we reach a point of zero inconsistency where the negative behavioral consequences are just balanced by positive justification (positive anticipated behavioral consequences). As we move beyond the trough, the resultant justification is positive. The "sweetness" threshold is the point at which the amount of net positive justification begins to enhance or "sweeten" the behavior -- the so called incentive effect. By a secondary reinforcement -- like process, oversufficient justification colors the view the person has of his choice in such a way that its value is enhanced. In general, the resultant justification for a given alternative reflects the spread in choice

This model is similar on the surface only to Calder and Staw's (1975b) means-ends analysis conception since it is based on dissonance theory. All factors affecting attitude change do so through their effects on resultant justification for behavior. Similarly in attribution theory the affects attached to tasks and their consequences change attitudes towards the tasks through the hypothetical means-ends analysis. Thus, resultant justification plays a key role in both conceptions. The degree of resultant justification is determined from a combination of both intrinsic and extrinsic factors. Intrinsic justification may thus be regarded as synonomous to intrinsically motivated behavior. For example, when the individual perceives himself to be motivated by intrinsic factors (means) or similarly, when he attributes locus of causality for his behavior to the interest he has for the task itself he is said to be intrinsically motivated. However, this represents a theoretical departure from the forced compliance research which is based on cognitive dissonance theory and utilizes the concept of an underlying motivational tension state (Festinger, 1957).

A prediction derived directly from dissonance theory is that the larger a reward received for an activity the less the resultant cognitive change (Brehm & Cohen, 1962). On the other hand, both cognitive evaluation theory and attribution theory introduce the concept of an "unstable" attributional state, where behavior is perceived as over- justifiably caused (more than one valid cause). The prediction derived from this conceptualization is that the latger a reward received for an activity *the more likely* that cognitive change will occur. Both within over- and under-justification research however, reward magnitude is considered to be an important variable although the specific predictions rest on fundamentally distinct processes.

Inequity Theory

In essence Adam's theory of inequity (1963) states that individuals make comparisons of their behavioral efforts with those of others in similar situations. Equity exists when the perceived input (effort) to output (reward) ratio is equivalent to the ratio of others. Inequity results when these ratios are not equivalent. The perceived inequity in such situations results in a hypothesized tension state to restore equity. A number of hypothesized alternatives are available: (1) increase or decrease the outcomes (rewards), or (2) increase or decrease the inputs by varying effort. Most research employing predictions testing the resolution of inequity have had considerable methodological difficulties. However, in general there exists some support for the hypothesis that subjects increase their efforts to bring inputs and outputs into balance and thus reduce feelings of inequity (Goodman & Freidman, 1971). In the analysis of over-and-under sufficiency conditions inequity theory would predict a reduction in perceived inequity as reward magnitude increased to an optimal point. Thereafter, inequity would again arise as a result of an overjustification effect. Also, inequity theory is based on subjective comparisons of input-output ratios between self and other and therefore not on a purely self basis. This analysis suggests that individuals would reduce their behavioral efforts (outputs) in order to balance the self-other ratios when deprived of reward in relation to others. This also has particular relevance to the present study since inequity theory represents another tension-state theory raised as an alternative to the attribution hypothesis (Deci, 1972).

However, there are as yet two unresolved methodological issues in inequity research: (1) the problem of devalued self-esteem, and (2) the problem of induction. The former, Goodman & Freidman (1971) state, relates to the fact that most of the studies supporting the inequity hypothesis have not empirically determined whether self-devaluation or inequity feelings account for the observed variances in behavior. The latter, relates to the method of inducing the subject to perceive that his outcomes are related to his inputs, which is necessary for inequity feelings to occur. Thus, when there does not exist a perceived connection between outputs and inputs no observed behavior changes should occur.

Deci (1972) states that an internal standard or "comparison other" may also be used within the framework of inequity theory. Based on Pritchard's (1969) work, he suggests that inequity feelings may arise from a disproportionate relationship between person's own inputs and his outputs. Deci explains that predictions from cognitive evaluation theory seem diametrically opposite to predictions based on equity theory. That is, "The cognitive evaluation theory prediction, is that he would be less likely to continue to work (p. 114)." Deci then proposed a conceptual integration of these two theories, and suggests that whether or not a person has feelings of inequity his intrinsic motivation is still reduced in the presence of an external reward.

The Competing Response Hypothesis

The fundamental proposition of this hypothesis, introduced by Reiss & Suschinsky (1975a,1975b,) as a viable alternative to the attributional model, is that environmental stimuli (e.g. reward, distractors, etc) can impair or facilitate intrinsic motivation by eliciting more or less enjoyable ways of performing an activity relative to a control condition. Therefore "any responses that facilitate task enjoyment are termed competing responses (p. 235)". The introduction of an expected reward in the presence of an already interesting activity can arouse many competing response effects (e.g. performance anxiety, frustrative delay of reward, distraction effects, hurried performance, etc). The greater the extent to which such competing responses are aroused during training, the greater is the subsequent loss in intrinsically motivated responses in the experimental activity. Reiss & Suschinsky (1975b) also postulate three major processes by which loss in intrinsic motivation can be accounted for: (1) the arousal of unpleasant affect may lead to aversive Pavlovian conditiong (especially under moderate levels of frustrative delay of reward), (2) the subject's recognition that he did not enjoy the activity during the experimental session may mediate a relatively persistant effect, and (3) arousal of competing responses could impair performance quality and this could mediate a relatively persistant effect. With respect to the major competing response effects Logan (1976) concludes that," the major factor determining the detrimental effects of delayed reward is the behavior that occurs during the delay interval (p. 105)." This is precisely what the competing response hypothesis postulates lies at the basis of the observed decrements in the intrinsic motivation studies. Differential hypothesis generated by attribution theory and competing response theory, have been tested by Ross (in press) and Reiss & Suschinsky (1975b) and will be reviewed in the following chapter.

EVALUATION OF THE THEORIES

The theories reviewed are cognitive theories since they resort to cognitive mediational explanations to account for empirical data. However, an important distinction can be made in their conceptulization of the motivation construct. Cognitive dissonance theory (Festinger, 1956) and equity theory (Adams, 1963) rely on a postulated tension-reduction process to account for both behavioral and attitudinal displacements. On the other hand, cognitive evaluation theory (Deci, 1971) and attribution theory (Kruglanski, 1975), strictly speaking, do not postulate an aversive motivational drive. That is, attribution theory accounts for behavioral displacement in terms of the causal attributions an individual makes regarding his behavior. Often these attributions may be based on observable and salient stimuli outside the individual himself. Bem (1967) in an important conceptual reanalysis of diverse dissonance research suggests that more often than not publicly observable stimuli and behaviors are at the basis of the attributions made. Thus, an individual's attitudes and behaviors may be viewed as inferences from observation of his own behaviors and the accompanying stimulus variables.

In terms of the motivational analysis of under-and over-justification phenomena related to the introduction of extrinsic rewards, dissonance theory makes the less obvious and more subtle predictions within the underjustification condition and attribution theory makes the less obvious and more subtle predictions in the over justification conditions. Dissonance theory predicts less cognitive change with increasing reward magnitude and low task interest, whereas attribution theory predicts more cognitive change with increasing reward and task interest. Although the theories postulate distinct and different underlying psychological processes, they may still be considered as complementary since each model seems to have relevance to a particular segment of the justification curve. The important distinction lies in the hypothesized underlying process. In the case of perceived overjustification attribution theory hypothesizes a shift in the perceived locus of causality, with a subsequent decrease in intrinsic motivation. The larger and more salient the extrinsic reward the more likely this decrease. In the case of perceived under justification dissonance theory hypothesizes an increase in intrinsic motivation with a subsequent decrease in experienced dissonance (i.e. tension). The larger the reward or external justification the less the experienced dissonance with less subsequent cognitive change.

Adams (1963) proposed a theory of inequity wich also relies on a postulated underlying tension state. Interrestingly, inequity theory makes predictions opposite from those of attribution theory within the overjustification conditions. However, inequity theory also poses serious menthodological problems that have made it difficult if not impossible to test. Despite this, Deci (1972) has attempted a conceptional integration of the two models.

Finally, the competing response hypothesis, forwarded by Reiss and Suschinsky (1975,1976) is based on the delay of reinforcement concept. Competing response effects are thought to be reinforced responses that are incompatible with the originally reinforced responses during the delay period. This results in the competing responses to be more strongly reinforced than the intended responses. Interestingly, Logan (1976) qualifies the delay of reinforcement concept by adding that language can offset the detrimental effect of delayed reward through secondary reinforcement to help bridge the time of delay of actual reward. This is particularly relevant to the present study since reward is not made success contingent but is allocated on the basis of performing the task without regard to quality of performance or degree of success on the task.

In sum, a number of alternative explanations have been forwarded in the literature to account for the negative effect of extrinsic rewards on intrinsic motivation. Because of these divergent explanations and theoretical issues the concept of intrinsic motivation as a psychological construct remains conceptually somewhat unclear. However, as Calder and Staw (1975b) state it still remains a usefull concept since it addresses the interaction of extrinsic and intrinsic variables from the point of view of the individual himself. That is, intrinsic and extrinsic motivation are defined in terms of the individual's subjective perceptions of personal causation. This was the original concept introduced by de Charms (1968); and subsequently this core idea has been extended and added to by various formulations as the concept of intrinsic versus extrinsic motivation came under empirical scrutiny. For example, Bem's (1972) self-perception theory suggests that the individual infers his internal state by observing his own behavior in the context in which it occurs. This leads to the individual labelling his behavior as internally caused in some situations and externally caused in other situations. The central question then becomes what this does to subsequent attitudes and behaviors.

This question has led to the empirical investigation of variables that play a major determining role in self-perception processes, which up to this point have not been investigated in other conceptual systems.

SELECTIVE REVIEW OF THE EMPIRICAL LITERATURE

The following section is a selective review of empirical studies that have investigated various aspects of the intrinsic-extrinsic motivation question. Only those studies of particular relevance to the present investigation are dealt with in detail. With the exception of one early field study and several more recent nursery school studies all of the experiments were conducted in laboratory settings employing an essentially similar paradigm. The experimental time was devided into training or work periods and free-time periods. During the free time periods subjects could choose or not choose to work on the experimental task, usually in the presence of various distractors. Both behavioral and attitudinal measures usually served as the dependent variable measures. The early studies were designed to investigate the basic hypothesis formulated originally by de Charms (1968). This led to various modifications in the theoretical explanations and investigation of what Calder and Staw (1975a) call boundary variables. These were defined as parameters of the task environment and reward or other variables that have a delimiting effect on the hypothesized relationship between intrinsic and extrinsic motivation. More recently, specific issues have dominated the literature. These have resulted in differential predictions derived from alternative models to the original cognitive evaluation model.

Early Studies Investigating the Hypothesized Shift in Locus of Causality

Deci (1971,1972a) conducted two laboratory and field experiments to investigate the effects of external reward on intrinsic task motivation. In each experiment, subjects were requested to perform an activity over three different time periods (periods 1,2,3). The degree of intrinsic motivation was the amount of time the subject spent on the puzzle during an 8-minute free-choice situations as well as the subject's rating of the degree to which they found the task interesting and enjoyable on a Likert-type scale. External rewards were given to the experimental subjects during the second period only, while the control subjects received no reward. The differences in the experimental groups' intrinsic motivation between Period 1 and Period 3 relative to the differences in the control's indicated that: (1) with money as the external reward, intrinsic motivation decreases, and (2) with verbal reinforcement in the form of positive feedback as external reward, intrinsic motivation increases.

To account for these findings Deci (1971,1972b) forwarded the hypothesis that a change in perceived locus of causality from external to internal cuased the reduced task persistance. More specifically, he asserted that extrinsic rewards have more salience than intrinsic rewards and thus "co-opt" intrinsic motivation (Deci, 1975). Furthermore, he also forwarded the idea that individuals make choices about their behavior on the basis of their perception and will behave in accordance with these perceptions regarding the locus of causality.

Contingent versus Non-Contingent Rewards

Deci (1972b) in another study investigated the effects of extrinsic reward on intrinsic motivation as mediated by reward made contingent on performance versus reward made non-contingent on performance. As well, in this study he investigated the effects of verbal external reward. He reported that a person's intrinsic motivation to perform an activity decreased when he received contingent monetary payment, threats of punishment for poor performance, or negative feedback about his performance. Non-contingent monetary payments left intrinsic motivation unchanged, and positive verbal reinforcements appeared to enhance intrinsic motivation.

In all of Deci's early studies money was administered contingently (i.e. money was received by the subjects dependent on performance). Therefore, this study represented the first test of the contingent versus non-contingent question. To account for the results Deci (1972c) reasoned that under the non-contingency condition performance is not tied directly to rewards which makes it less likely that subjects will percieve the locus of causality outside themselves. He stressed the "less likely" suggesting it is not impossible that non-contingent rewards decrease intrinsic motivation.

Timing of Reward

Using the same experimental design as in his earlier studies, Deci (1972d), also investigated the effects of the timing of extrinsic and intrinsic factors. The independent variable of extrinsic reward was varied so that subjects solved puzzles in one of the six conditions:

(1) no reward,

(2) Money before the free-choice period,

(3) money after the free-choice period,

(4) money and positive verbal reinforcement,

(5) positive verbal reinforcemnt before the free-choice period,

(6) positive verbal reinforcement after the free-choice period.

As predicted, subjects who were rewarded with money were less intrinsically motivated than non-rewarded subjects and subjects paid before the free-choice period worked harder on the puzzles than those paid after the free-choice period. The effects of verbal reinforcement were in the predicted direction but did not reach statistical significance. Interestingly, subjects who received money and verbal reinforcement similtaneously, showed no significant difference in intrinsic motivation as compared to the control group.

It is also interesting to note that when male and female subjects were considered seperately, Deci found verbal reinforcement significantly increased intrinsic motivation in males but not in females. This finding prompted Deci to make the distinction between the "controlling" aspect and an "information" or "feedback" aspect of extrinsic reward. When money is given "as an external reward," the controlling aspect is clearly the strongest and leads to a decrease in intrinsic motivation. When positive verbal reinforcement is given on the other hand, the information aspect is clearly the strongest and leads to an increase in intrinsic motivation. The differential male-female findings seem to indicate that positive feedback strengthened feelings of competence and self-determination in males, whereas for females it changed their perceived locus of causality. Deci (1972b) suggests that socialization of males versus females in our society is responsible for this effect. However, the major purpose of this study was to test a cognitive evaluation versus inequity hypothesis. Deci (1972d) reasoned that subjects paid prior to the free-time period would experience inequity and thus continue to work while subjects paid after the free-time period would not experience inequity and thus not continue to work. Therefore, timing of reward was hypothesized to determine whether or not the subject would experience inequity or cognitive reevaluation. Calder and Staw (1975) have criticized this study suggesting that Deci's conclusions cannot be validly derived from his data since the use of only one independent measure to tap two distinct underlying processes is not experimentally valid.

Expectation of Reward

There is some evidence indicating that expectation versus no expectation of reward is related to intrinsic motivation. Lepper, Greene, and Nisbett (1973) using a group of kindergarten children varied the expectation as well as the level of extrinsic reward. In this study, preschool children were assigned to one of three treatment conditions (expected reward, unexpected reward, and no reward) on the basis of a criterion of intrinsic motivation for a drawing activity during baseline observation in the classrooms. The extrinsic reward was a "good player reward" certificate adorned with a gold seal and ribbon. Measures of intrinsic motivation were obtained one or two weeks after the experimental sessions and consisted of recording spontaneous classroom drawing activity. They found that children who expected a reward for an interesting task (playing with magic markers) subsequently showed less intrinsically motivated behavior in a free-time situation than subjects who did not expect the reward or who received no reward.

Greene and Lepper (1975) replicated the above study and in addition measured the effects of low performance versus high performance demands, making the reward contingent on the level of performance. The results of this study provided a near perfect replication of the earlier study by Lepper et al (1973). However, the manipulation of the performance demand in this study produced no significant effect. Greene and Lepper suggest that the negative effects of expected rewards on intrinsic motivation are therefore not limited to whether rewards are presented contingent or non-contingent on performance.

Kruglanski, Alon, and Leiws (1972) manipulated two independent variables: (1) the presence versus absence of prizes awarded to members of the winning teams in a series of game competitions conducted in classrooms, and (2) the time at which the measurement of the dependent variable was carried out: immediately following the experimental session and one week after the experimental session. No significant difference between the groups was found on an open-ended question testing for causal attribution. However, on a close-ended question, a significant difference between the groups was found. Also, the prize group rated their task significantly less enjoyable than the no-prize group. Analysis of the scores of rated task enjoyment showed virtually no change over time. Kruglanski, Alon and Lewis concluded that intrinsic interest for an activity decreases when subjects receive an unexpected reward after performing an interesting activity.

The data of these studies suggest that when extrinsic reward is expected the individual is more likely to perceive the reward as the cause of his behavior (Deci, 1975). However, this effect may not be as important as the empirical data suggests since unexpected reward may initiate retrospective evaluation (Deci, 1975). In the Kruglanski, et al (1972) study rewards were recieved by the children after the game activities were performed and were not expected, yet there was less subsequent intrinsic interest in the activities than in the no-reward controls. Deci (1975) suggests that reward expectation increases the salienly of the causal link between reward and behavior and thus mediates the reward-intrinsic motivation relationship.

Task Performance and Magnitude of Task Intrinsic Motivation

Kruglanski, Freidman, and Zeevi (1971) demonstrated that the decline in liking of an activity due to extrinsic attributions is paralleled by a decline in the quality of performance. Subjects were tested under two experimental conditions on a variety of tasks (creativity, recall, and Zeigarnik measures). Subjects in the extrinsic-incentive condition were promised a reward (guided tour) for their participation in the experiment. No reward was given to the no-incentive group. It was found that subjects in the incentive group as opposed to subjects in the non-incentive group exhibited superiority in creativity of performance and task recall. In addition, they manifested a stronger Zeigarnik effect, and reported greater enjoyment of the experiment.

Kruslanski, Riter, Arazi, Agassi, Montiqui, Peri, and Peretz (1975a) investigated the relation between the magnitude of task intrinsic reward and the degree of intrinsic and extrinsic motivation towards the task. In one experimental condition (high intrinsic reward) the task was designed to be interesting and challenging. In the other condition (low intrinsic reward) it was designed to be dull. The results of three seperate experiments provided strong support for the hypotheses that: (1) the extent of intrinsic motivation varies positively with the magnitude of task-intrinsic rewards and, (2) the extent of extrinsic motivation varies negatively with the magnitude of task-intrinsic rewards.

The Content-Consequence Distinction

Kruglanski, Riter, Amitai, Margolin, Shabtai, and Zaksh (1975b) studied the content-consequence aspect of external rewards. The data supported the hypotheses that when payments are inherent to the task's content their presence (versus absence) increases intrinsic motivation, whereas when they constitute the task's exogenous consequence their presence (versus absence) decreases intrinsic motivation toward the task. The findings were interpreted as consistent with the assumption that intrinsic motivation ensues whenever the actor causally attributes his performance of the task to the task's content and inconsistent with the proposal that intrinsic motivation be identified with internal (or self) attributions and extrinsic motivation with attributions only to the external environment.

Negative Extrinsic Reward

Deci and Cascio (1972) studied the effects of negative feedback and threats of punishment on intrinsic motivation. Subjects in this study solved puzzles during the first part of the experimental sessions, and then observations relevant to their intrinsic motivation were made. Subjects in the negative feedback condition were given very difficult puzzles to solve so that they failed on more puzzles than the control subjects who were given easier puzzles. Those in the high failure (negative feedback) condition showed less intrinsic motivation following their puzzle-solving session than did control subjects. Subjects in the threat condition received an aversive buzzer each time they were unable to solve a puzzle, while the control subjects did not receive the buzzer. Those subjects threatened with the buzzer showed less intrinsic motivation than control subjects. These results however only reached marginal significance.

Intrinsic and Extrinsic Motivation as Independent Variables

Calder and Staw (1975b) designed a study to test the effects of extrinsic reward on intrinsic motivation more directly by manipulating both the intrinsic and extrinsic factors as independent variables. This study has particular relevance to the present study since the measure of intrinsic motivation was achieved by analysis of scores of rated task enjoyment by subjects. One aspect of the present study is designed to test the relationship between self-report measures of intrinsic motivation and a behavioral measure of task persistance. The measure of intrinsic motivation consisted of subjects rating the extent to which they found "the puzzle task itself" enjoyable on a 17-point Likert-type scale. Several other questions on a 11-point scale concerned the subjects' perception of the situation. Since the procedure did not employ the typical free-time measure (Deci, 1971, 1972a, 1972b; Lepper et al, 1973), subjects were asked to volunteer for future experiments of a similar nature without payment (time for which subjects volunteered as coded in minutes). The independent measure of intrinsic motivation consisted of 15 jigsaw-type puzzles, one set with pictures (high intrinsic motivation) and the other set blank (low intrinsic motivation). Through pilot testing task behavior was equated so that the tasks differed only on the affective dimension of intrinsic motivation. Results revealed a significant Blank-Picture x Money interaction for the task enjoyment variable but a non-significant interaction for the time volunteered variable. In addition, two other findings are reported; (1) the introduction of the extrinsic reward (money) apparently decreased the perception of task effort ("trying") on both the high and low intrinsically motivating tasks, and (2) subjects were only "aware" of the effects of external factors on their level of motivation and not internal factors.

Within this paper Calder and Staw (1975b) also distinguish between a statistical and motivational interaction. The term interaction with respect to motivational phenomena is meant to define their finding that total motivation (in a situation where extrinsic rewards are added to an already interesting activity) is equal to intrinsic plus extrinsic minus an interaction between the two. Had these authors not found a statistical interaction they would still have found the motivational interaction effect because of the main effect of high rewards producing a decrease in subsequent intrinsic motivation. The interaction hypothesis was predicted upon two effects: (1) an inverse effect (self-perception) when the task is initially high in interest (overjustification phenomena), and (2) a direct (or reinforcement) effect when there is initially less interest in the task. Therefore, when the task is less interesting, self-perception phenomena is not expected to apply since no over-justification perceptions exist. This is also relevant to the present study since the prediction of a direct reinforcement effect is not expected to apply with duller tasks when individually chosen. In the Calder and Staw (1975b) study the two tasks were group validated (see next section).

Reward Saliency

Ross (1975) conducted three important experiments where pre-school children were shown either a salient-reward condition or a non-salient-reward condition and a cue reminding them of the reward to be administered at the end of the task. He found that both in immediate and delayed (free-time) play the children in the salient-reward condition showed significantly greater decrease in free-time play than non-salient or control children.

In a second study (Ross, 1976), children were asked to think about an unrelated topic (distraction condition) or were not explicitly asked to think. Children in the distraction condition and in a non-reward control condition displayed the most interest in the activity, adding weight to the findings of his first study. It is here that Ross suggests a delay of gratification hypotheses as an alternative to the attribution hypotheses to explain his results.

In a third study children drew under one of three conditions: No reward (control), wait-contingent reward (rewarded for merely waiting for experimenter to return), and task-contingent reward (rewarded for drawing). The results indicated that the task-contingent condition resulted in both the greatest degree of reduced intrinsic task interest and quality of performance. Ross suggests that these results indicate that the frustration due to delay of reward effect is not the critical proces involved in reduced task interest. This study also has relevance to the present study since Ross utilized several play activities in the experimental room.

Performance Contingent Rewards

Most of the studies reviewed so far seem to indicate that salient and contingent rewards reduce intrinsic motivation for a task. Ross, Karniol, and Rothstein (in press) conducted two inportant studies which indicated that decrements in intrinsic motivation however may not be inevitable. Rewards have cue value when their attainment is a function of task success and their reception signifies competence at the task. In most of the previous studies rewards were dispensed contingent on performing the task only rather than on success criteria. Thus, Ross (1976) suggests, that such rewards have little or no cue value and may have a particularly detrimental effect on intrinsic motivation since there is simply a means ends relationship between activity and reward. On the other hand, when rewards are performance contingent, reception of the reward provides a cue of successful performance and task competence. Therefore, performance contingent rewards should increase subsequent intrinsic motivation.

In the first experiment, college students worked on a cooncept-formation task under three conditions: (1) no reward (controls), (2) money contingent on undertaking task, and (3) maney contingent on successful solutions. Dependent measures of intrinsic interest were subjects evaluations of task and reported willingness to perform the task on subsequent occasions without reward. The results provided strong support that rewards reduced intrinsic interest only when not success-contingent.

In a second study with an early school population a nonmonetary reward (marshmallows) and a behavioral measure of intrinsic motivation (persistance at a concept-formation task during a 6-minute free-play period) was used. Also included in this experiment was a manipulation of the degree to which subjects succeeded at the activity. The results indicated that performance-contingent and control subjects played with the task significantly longer than did the noncontingent-reward subjects. These results therefore paralleled to those of the first study.

Nontangible Reward Conditions

More recently, Amabile, Dejong, and Lepper (1976) designed a study to explore the effects of externally imposed deadlines on individual's task performance and subsequent interest in the task. In two deadline conditions subjects were given an explicit time limit for solving a series of initially interesting word games. In one condition, the deadline was left implicit. In two control conditions, subjects were asked to solve puzzles to work at their own pace, and as fast as possible. However, here no explicit time limit was presented. Unobstrusive behavioral and attitudinal measures of interest indicated that in the absence of external constraints subjects in the deadline conditions were less interested in the game than subjects in the non-deadline conditions. However, no significant difference in interest were found between subjects in the two deadline conditions (explicit and implicit).

This study seems to demonstrate that an externally imposed deadline for task completion can result in significant decrements in intrinsic task interest. Therefore an extrinsic reward or goal need not be tangible to reduce intrinsic motivation. Unfortunately, these results could be easily explained using the competing response hypothesis at the explanatory model, since both the arousal of unpleasant affect and the subject's recognition of a lack of enjoyment during the experimental phase under the deadline conditions may have mediated a relatively persistant effect and become associated to the task. However, the authors found that performance quality and experimenter (not subject) evaluation of the task was the same in all groups.

EVALUATION OF EMPIRICAL RESEARCH

The findings in the majority of empirical studies are at least relatively consistent with the derivations made from attribution and cognitive evaluation theory. The effects of expected, salient, and contingent rewards on intrinsic motivation have been replicated using different rewards, subject populations, ranging from pre school children to college students, and different dependent measures. However, there are still methodological and theoretical issues that remain to be investigated. Many of these issues are dealt with in recent and comprehensive reviews (Deci, 1975; Notz 1975; Calder & Staw, 1975a; Ross, 1976; Reiss & Suschinsky, 1976). Only those issues of particular importance to the present study will be reviewed here.

Reward Salience and Reward Magnitude

One of the recurrent themes found in the empirical lirterature is an attempt to determine the conditions under which extrinsic rewards cause a decrease in subdequent intrinsic motivation. Within the attributional and cognitive evaluation model reward saliency is regarded as a major variable related to the individual's perceptions of behaviorsal causality. That is, the greater the saliency of the external reward the more likely it will be perceived as the cause of behavior. However, two alternative explanations are found in the literature; one derived from cognitive evaluation theory (Deci, 1972d), and the other derived from a reinforcement model (Reiss & Suschinsky, 1975).

Within the framework of cognitive evaluation theory, Deci (1972d) suggests that it is not reward saliency per se but the salience of the controlling component of extrinsic rewards that is the critical variable causing the subsequent shift in percieved locus of causality. Deci (1971,1972,1973) provides evidence that positive verbal feedback increases intrinsic motivation whereas monetary extrinsic rewards decrease intrinsic motivation. Thus, he asserts that it is the saliency of the controlling component of monetary extrinsic reward that accounts for these differential results. It seems however, that these conclusions on the basis of Deci's evidence alone remain somewhat, speculative. Within most of the studies reviewed in fact the extrinsin reward was designed to be highly salient to the subjects.

Ross, et al (in press) on the other hand provides much stronger evidence that rewards that are success contingent do not reduce intrinsic motivation. To test this hypothesis he conducted two studies manipulating the cue value of rewards. Both studies, using different subject populations and dependent measures of intrinsic motivation, supported the hypothesis that only rewards of low cue value (performance contingent rewards) decrease subsequent intrinsic interest in a task.

To test the effect of other saliency variables Ross (1975) also conducted two experiments with preschool children. In the first study saliency was manipulated with regards to reward visibility to the subjects while in the second study saliency was varied along an attentional dimension. Both studies provide strong evidence that reward salience in terms of visibility and attentional focus are critical variables and determining conditions that mediate the effects of extrinsic rewards on subsequent motivation.

In sum, within the attributional and cognitive evaluation models reward saliency is hypothesized to mediate the effects of extrinsic rewards in intrinsic motivation in three ways: (1) visibility of the reward, (2) attentional focus, and (3) cue value (controlling vs. informational component).

A prediction derived from the saliency hypothesis is that reward magnitude is related to subsequent decrements in intrinsic motivation. That is, a larger and more desirable, and thus more salient reward is more likely to cause a shift in percieved locus of causality than a smaller, less desirable, and less salient reward. This prediction is made on the basis of two related effects: (1) a powerful extrinsic reward may lead individual's with an initial interest in an activity to reatribute their interest in that activity to the salient external reward, and (2) conversely the presentation of a small and minimally salient but sufficient reward may induce in individuals, with less initial interest in a task, an internal attribution with increased intrinsic motivation (Lepper & Greene, 1976). Interestingly, within the overjustification literature, these predictions have remained untested as only the effects of a salient reward versus no-reward have been tested. This leaves a serious gap with respect to an important property of extrinsic monetary rewards. This is of singular importance to our understanding of the effects of rewards on intrinsic motivation since virtually nothing is known empirically of the nature of the relationship between reward size and subsequent intrinsic motivation. It is interesting to speculate that this relationship may not be a monotonic one. Although a very small reward may not be salient and powerful enough to be percieved as the cause of behavior, there may be other so far ignored factors, operative that could affect subsequent intrinsic motivation in unexpected ways. This point will be persued after a brief review of the competing response effects explanation.

As stated before, a major alternative explanation of the intrinsic motivation phenomena, forwarded in recent years by Reiss & Suschinsky (1975,1975a), is the competing response hypothesis based on a reinforcement model. This alternative explanation represents the most serious challenge to the attributional and cognitive evaluation explanations. In fact, Reiss & Suschinsky (1976) suggest that all research supporting the overjustification hypothesis is more appropriately accounted for in terms of the competing response hypothesis. The most fundamental proposition is that there exist different ways in which any particular activity can be performed. Presumably there is an underlying continuum of degrees of enjoyment associated to the manner in which a particular experimental task is performed. This hypothesis predicts that practice of an activity under a high degree of enjoyment relative to past experience or a control group leads to acquisition of intrinsic motivation. On the other hand, practice of an activity in a way less enjoyable relative to past experience or a control group impairs subsequent intrinsic motivation. Thus, Reiss and Suschinsky state, "That for any play activity there exists a set of responses that facilitate task enjoyment. Generally, these responses include a certain degree of attention to the activity ... performance of the activity in the absence of aversive affect, performance of the activity at a relaxed pace, successful performance ... so that any response that interferes with responses that facilitate task enjoyment, will be termed competing responses (p. 235)." Thus, it is suggested that the introduction of an expected reward can arouse many responses that compete with responses facilitating task enjoyment. "Moreover, simultaneous exposure to two reinforcing activities (reward and intrinsically motivated activity) could arouse attentional approach conflicts that are aversive (p. 214)."

Reiss and Suschinsky suggest this hypothesis leads to a number of critical issues: First, the competing response hypothesis proposes that the greater the extent of arousal the greater the decrement in intrinsic motivation of the experimental activity. The second issue relates to Reiss and Suschinsky's use of the internal-external partition. That is, their definition of intrinsic motivation is largely dependent on the absence of any immediately discernable environmental reward. Therefor, any studies attempting to study intrinsically motivated behaviors are potentially open to criticism of whether the testing procedures evaluate extrinsic motivation, since it is difficult to control an environmental stimuli. This, it is suggested is of major consern and raises the issue of possible transfer of an expectation of reward from training to testing situations. Basically, Reiss and Suschinsky critique what is referred to as the "all or none" conception of intrinsic motivation as conceptualized in the attributional model. However, this is precisely where the opposing theoretical positions' divergence is critical since the attributional explanation is based on an analysis of the individual's perceptions of what causes his behavior. Whatever the objective cause of behavior may be, attribution theory, self-perception theory, and cognitive evaluation theory take the individual's subjective perceptions of behavioral causality as the central theoretical springboard to generate testable hypothesis.

The theoretical divergence is of particular interest to the present study since the concept of competing response effects draws attention to other important aspects of extrinsic rewards ignored in previous investigations. This is highlighted in the review of the empirical literature by several unresolved issues. For example, the findings surrounding the issues of contingent versus non-contingent and expected versus unexpected rewards are still equivocal. The results from various studies are mixed and may be related to slight differences in environmental settings, task parameters, and rewards aspects. Each of these variables could create distinctly different psychological situations, with important attitudional and behavioral consequences. However, in terms of the reward magnitude variable, competing response effects are also influenced by the size of extrinsic reward, but the effect predicted is of a more continous nature. That is, decrements in subsequent intrinsic motivation are dependent on increments in reward magnitude inducing degrees of arousal from competing effects. Thus, a large reward is assumed to induce greater frustration during the delay period than a smaller reward with a subsequentally larger decrement in task interest.

In sum, in terms of attributional processes the presence of a large reward leads to the individual's attention being focused outward away from the task in an "all of none" fashion. When in the presence of a small and negligable reward the individual's attention is more internally focused away from the reward, which may even lead to an increase in intrinsic interest. On the other hand, in terms of competing response effects large rewards represent more powerful distractions and frustrators than smaller rewards, therefore leading to a greater decrease in intrinsic motivation. Thus, both theoretical explanations lead to a similar prediction: that reward magnitude is related to subsequent decrements in intrinsic task interest. However, the hypothesized underlying processes are distinctly different, with the competing response explanation perhaps drawing attention to a host of factors not taken into account within a pure attributional model.

Reward and Task Choice

Another aspect that the preceding literature review points out is related to the level of reward and task interest as independent variables. In all of the previous studies level of reward (reward vs. no-reward) and level of task interest (high interest vs. low interest) was determined on a group validated basis without consideration for individual choice (self-choice). That is, the independent measure of level of intrinsic motivation was determined through pilot testing to achieve tasks that differed significantly only on the percieved intrinsic interest dimension but were equated on other cognitive and behavioral task dimension (if more than one interest level was employed). Calder and Staw (1975b) for example, utilized a series of semantic differential scales to equate a blank-

and picture-jigsaw puzzle on all but the affective (liking) dimension. However, even then subjects could still have differential task perceptions, not tapped by the equating procedure, that could influence subsequent dependent measures of task behavior in unexpected ways.

With regards to rewards none of the previous studies have provided subjects with a reward choice. Recent findings have reported that self-reinforced responses may be more resistant to extinction than externally reinforced responses (Weiner & Dubanoski, 1975). A number of studies have shown greater resistance to extinction among self-reinforced groups compared to experimenter-reinforced groups on discrimination tasks (Johnson, 1970; Johnson & Martin, 1971; Bolstad & Johnson, 1972). Weiner and Dubanoski (1975) suggest four possible causal eplanations: (1) reinforcement recieved under external control (Rotter, 1966) is less likely to strenghten behavior than is reinforcement under internal control, (2) percieved control over the environment may be more reinforcing (Chaikin, 1971; Kanfer & Siedner, 1973), and self-reinforced groups may percieve greater control over their environment, (3) differential reinforcement history may result in the establishment of self-evaluation as a conditioned reinforcer, and (4) under conditions of self-reinforcement subjects may chose a schedule most reinforcing to themselves and thus more resistant to extinction. While these findings raise interesting questions it seems that some important questions regarding the effects of self-reinforcement on intrinsic motivation have so far been overlooked. How, for example does self-reward affect subsequent interest in a task? Although this question is not directed at the acquisition of a new response and subsequent extinction of that response as related to self-reinforcement it deals with the effects of self-reinforcement on responses already within the behavioral repertoire of the subject and with a high degree of associated interest. There is a crucial similarity however in both the learning and intrinsic interest situations; it can be said that in both situations the subject works on the experimental task to achieve an end state or result (i.e. reward choice). Within the intrinsic motivation situation the emphasis however is on the extent to which reward choice leads to perceptions of extrinsically motivated behavior with an expected concomittant decrease in intrinsic interest for the task.

Dependent Measures of Intrinsic Motivation

Although there are several distinct conceptualizations of the construct of intrinsic motivation its operationalization rests primeraly on observed behavior in the absence of any immediately identifiable rewards other than the activity itself. Lepper and Greene (1976) argue that the extrinsic versus intrinsic motivation distinction has proved to be a useful concept in generating new and testable hypothesis on two ways: (1) among experimental social psychologists the distinction between internally and externally governed behavior has long been regarded as fundamental (Kelman, 1958; Collins, 1973; de Charms, 1965; Bem, 1972), and (2) heuristically, the distinction has proved valuable in drawing attention to the fact that different processes may be involved in controlling behavior in situations were there are clearly identifiable external contingencies in contrast to those situations were there are no immediately idenfiable contingencies (Collins, 1973; Rosenhan, 1969).

This theoretical conceptualization has led to the operationalization of intrinsic motivation according to a specific set of criteria: (1) subjects must display interest in an activity in the absence of any salient extrinsic contingencies, and (2) subjects must not expect any future reward condition to be implemented contingent on their activity on the task. All of the studies reviewed utilized experimental designs that incorporated measures of intrinsic motivation based on these criteria. However, the actual dependent measures employed have ranged from observable task persistence during a free-time period to various self-report measures or attitudinal measures.

A fundamental assumption has been that both the attitudinal and behavioral measures tap the same underlying state of intrinsic motivation for an activity. Moreover, both the attitudinal and behavioral measures are thought to reflect intrinsic motivation as defined in attributional terms; that is, the subject's perception of an internal locus of causality or a high degree of liking for the task in relation to external variables. The major assumption has been that there exists an innate relationship between attitude and behavior. However, Doob (1947) and Bandura (1969) long ago argued that there may not be a one to one relationship between the two. Basically, an attitude may be a learned predisposition to respond or a learned mediating response. Once the attitude is learned the appropriate behavioral response must also be learned. Thus, two individual's may hold the same attitude but also display different learned responses given certain other variables are present.

Although the majority of studies have utilized either behavioral or attitudinal measures (and more recent studies have utilized both measures to generalize their results) and found fairly consistent results with both measures a number of studies have also found mixed results demonstrating that the attitudinal and behavioral measures do not always correspond as directly as is believed. It is interesting to note that in none of the previous studies was a systematic attempt made to analyze the underlying factor structure of these two broad classes of intrinsic motivation.

CHAPTER III

RATIONALE, DESIGN, AND HYPOTHESIS

RATIONALE

The preceding theoretical and empirical literature review has pointed out a number of specific areas and issues for further empirical investigation. The present study was designed to investigate some of the issues raised by the literature. Three major questions are addressed. The first question investigated is the effect of extrinsic monetary reward on individually determined, rather than group validated task motivation. All of the studies to date have pre-tested experimental tasks to determine motivation level and to equate other (behavioral and cognitive) dimensions to control differential task perception (Calder & Staw, 1975). The present study investigates subjects' task motivation level based on individually determined task choices with behavioral and cognitive dimensions controlled through randomization. If extrinsic reward undermines intrinsic task interest this would add more support to the attributional analysis of task motivation because of the initially strong individual task interest factor. Notz (1975) in a lucid review of the literature concludes that more theoretical and empirical work needs to be conducted on specifying properties of tasks related to intrinsic motivation. More specifically, the degree to which the individual perceives personal freedom of choice and self-investment or commitment to the task may be related to personal causation. Individually determined task choice provides an opportunity to investigate this variable in the laboratory (p. 694).

An area of research relevant to this question consists of the free-choice studies where cognitive dissonance theory is the major theoretical framework used to generate predictions. Subjects are asked to select an object from a set of objects. The dependent variable is the subjects' subsequent attitude ratings on the chosen and rejected alternatives. Dissonance theory predicts an attitude displacement in the positive direction on the previously chosen object and a negative attitude displacement on the rejected alternatives. Bem (1967) however has done an interesting re-analysis of this prediction in attribution terms. If it can be demonstrated that individually determined task choice results in the predicted differential levels of task persistence in a free-choice situation where a number of alternative activities are available, this would add credibility to the concept of intrinsic motivation as a psychological construct since it is defined as task persistence (1) in the absence of any immediately identifiable external contingencies and (2) on a self-chosen target activity.

Also, the random distribution of tasks within the treatment groups (high and low intrinsic motivation) would ensure that any differential task perceptions are controlled since both groups would be working on all of the tasks with only affect towards the task manipulated as the independent variable.

The second major question investigated is the predicted negative relationship between the size of an extrinsic monetary reward and subsequent task interest for both initially interesting and less interesting activities. More specifically, the literature suggests that the larger the reward the more likely (1) it will be percieved as the cause of behavior or (2) the greater its potential distracting and frustrative effect. Conversely, a small reward is less likely to be percieved as the cause of behavior. However, this relationship may not be as clear cut conceptually as this. A very small reward may activate feelings of self-devaluation which could be related to observed decrements in task interest. To control for this effect rewards are allocated only on a performance-contingent basis in the present study.

Finally, the Calder & Staw (1975b) finding of a direct reinforcement effect with a less interesting task is not expected to apply in the present study due to a predicted dissonance effect associated to negative task displacement on the rejected task alternatives. However, dissonance theory also predicts less cognitive change with increasing reward magnitude. As a result less decrease in task interest is expected in the presence of a large reward in contrast to a smaller reward.

The third major question examined was raised in relation to self-reinforcement. The findings on self-reinforcement effects suggests that self-reinforcement leads to greater resistance to extinction on discriminative tasks than experimenter-reinforcement. In relation to intrinsic motivation this concept has remained unexplored to this point. Although within the attribution framework responses already established within the behavioral repertoire of the individual are investigated one commonality with the learning paradigm is, the fact that the subject works on the task to achieve an end result (i.e. choose an individually determined quantity of the reward). Although the self-reinforcement literature suggests this is an important variable, the rationale for this part of the present study also emerges out of attribution theory which predicts that reward self-choice leads to a shift in locus of causality perceptions with subsequent impairment in intrinsic motivation.

Finally, the underlying factor structure of the two previously mentioned classes of measures (attitudinal and behavioral) is investigated.

One other question investigated and indirectly related is the effect of a purely cognitive variable classified as a deprivation condition. Although no specific hypothesis are generated this variable relates to inequity theory since subjects will be deprived of rewards or outcomes. Inequity theory predicts a subsequent drop in work behavior or task persistence due to feelings of inequity generated by the monetary deprivations in relation to other subjects. Moreover, the induction of inequity does not include possible self-devaluation since dubjects will be informed that the deprivation is the result of a random process. However, one real limitation to this procedure is that no provision is made to have the subject experience a connection between his inputs and behavioral outputs.

DESIGN

In order to investigate the listed question, one pilot study, and two preliminary studies were conducted prior to the main investigation. The pilot study was designed to determine the five experimental tasks to be utilized as choice objects. In study one the main focus was given to establish a norm for a behavioral measure of intrinsic motivation (i.e. task persistance). This study consisted of two phases: (1) first, a behavioral norm was established on five experimental tasks, and then, (2) subjects' individually determined choice of high and low intrinsic task interest was compared to the previously established norm and to each other. Two seperate and independent samples of subjects were randomly assigned to each group. In addition, the intercorrelations and factor structure of the same set of dependent variable measures were compared to the results of study 3. In sum, study 1 and 3 were designed for the purpose of: (1) Determining the intercorrelations between various measures of intrinsic motivation (task persistance and self-report measures - study 1 and 3), (2) determining whether the measures of intrinsic task persistence vary as expected from the previously established norm (study 1) and, (3) to determine whether individually determined task persistence results in significant differences betwen high and low task motivated groups (study 1). The second study was designed to determine the effects of pre-testing on the behavioral measure of task persistence which is the primary dependent variable of intrinsic motivation in the main experiment. Finally, the main study (study 3) investigated the effects of reward magnitude, reward choice, and reward deprivation on intrinsic task interest.

The main experimental design (study 3) consisted of five treatment groups with two levels of intrinsic task interest: High intrinsic task motivation and low intrinsic task motivation. Subjects were asked to choose by means of a paired-comparison procedure the task of the five previously established tasks, which they perceived as the most interesting and enjoyable. As established in study one, this enabled the experimenter to randomly assign subjects to one of the two levels of intrinsic motivation. Simultaneously, subjects were randomly assigned to work on their respective task under five treatment conditions during a 10-minute experimental time period:

(1) A two dollar reward,

(2) A twenty-five cent reward,

(3) A deprivation condition,

(4) A self-choice condition (any quantity between zero cents and two dollars),

(5) A no-reward condition (control group),

A number of rating scales similar to those previously utilized in studies investigating intrinsic motivation were chosen and presented on a pre- and post-basis in order to correlate self-report measures with the primary dependent measure of intrinsic motivation (i.e. time spent working on the task) which was measured unobstrusively during a second 10-minute free-time period.

HYPOTHESIS

THe hypothesis concerning the individual task choice experiment were tested in an attempt to ensure that this procedure leads to significantly different levels of intrinsic motivation as measured by task persistence. No hypothesis regarding the effects of pre-testing were specified and therefore this study may be regarded as exploratory. The hypothesis with respect to reward magnitude and reward choice were tested to evaluate the relationship between size of reward and reward self-choice as related to subsequent intrinsic motivation at both an interesting and dull motivational task level.

Finally, because the methodological difficulties associated to inequity theory make it difficult to determine its functional significance to the intrinsic motivation construct, no specific predictions were made. Therefore, examination of this variable (deprivation) in the present study may also be considered as exploratory.

Individual Task Choice

Hypothesis 1.

The high task motivated group will display greater task persistence over a 10-minute free-time period than the low task motivated group. This prediction is advanced since it is argued that individually determined task choice, based on the subjects percieved liking and enjoyment for a task, would be directly related to the degree of observed task persistance in the absence of any external contingencies.

Hypothesis 1.1

Both the high and low task motivated groups will display respectively greater and less task persistence during a 10-minute free-time period than a previously established behavioral norm. The rationale for this hypothesis stems from the assumption that both high and low percieved task liking should result in significant deviations in opposite directions from a behavioral norm which represents an average level of intrinsic motivation for a particular population (in this case college undergraduates). Previous research has utilized significantly different levels of intrinsic motivation through group validated pre-testing. The present methodology, should the hypothesis be confirmed, allow the investigation of not only individually determined task choice levels of intrinsic motivation but also the determination of whether a significantly higher and lower level of intrinsic motivation from a population average is being investigated.

Reward Magnitude

Hypothesis 2.

A two dollar reward group will display significantly less task persistence over a 10-minute free-time period than a twenty-five cents reward group or no-reward control group on a high intrinsic interest task. This hypothesis is derived from the basic assumption of attribution theory and self-perception theory that a negative relationship exists between size of extrinsic monetary reward and subsequent intrinsic task interest.

Hypothesis 2.1

A two dollar reward group will display significantly more task persistence over a 10-minute free-time period than a twenty-five cents reward group or no-reward control group on a low intrinsic interest task. This hypothesis is derived from dissonance theory which predicts decreasing cognitive change with increasing reward magnitude.

Hypothesis 3.

A self-reward (choice) group will display less task persistence over a 10-minute free-time period than a no-reward control group on a high intrinsic interest task. This hypothesis is based on the assumption that subjects will percieve self-reward as an extrinsically imposed reward condition with a resultant shift in locus of causality from internal to external.

No hypothesis is formulated to predict the effects of self-reward on a less interesting task, since no self-perception phenomena is expected to occur in this group and the relationship of reward choice to dissonance theory is conceptually unclear. To summarize, these hypotheses are based on the following effects: (1) a negative relationship between size of monetary extrinsic reward and initially high task interest, (2) a positive relationship between size of monetary extrinsic reward and initially low task interest, and (3) a negative relationship between externally imposed monetary reward choice and initially high task interest.

CHAPTER IV

METHOD

This chapter includes a detailed description of the general experimental procedures. It also includes description of the experimental subjects, the apparatus and experimental tasks utilized, the rating instruments used for pre-post treatment purposes, and a description of the primary behavioral measure of intrinsic motivation and the procedure involved in its measurement.

SUBJECTS

The total sample of subjects consisted of 343 undergraduate students drawn from various faculties, but predominantly from the Faculty of Business Administration and Dept. Educational Psychology at the University of Alberta. Their ages ranged from 43 to 18 with a median of 24 years.

PILOT STUDY

The subjects for this study were a total of 60 undergraduate students at the University of Alberta. The purpose of the study was to determine five tasks that would utilized in the remaining studies. The procedure consisted of asking the subjects to choose from thirty tasks presented to them, the three tasks with the highest perceived interest and enjoyment component and the three tasks with the lowest perceived interest and enjoyment components. During this procedure thirty tasks were laid out on tables and subjects in groups of 10-15 were asked to walk around the tables familiarizing themselves with each task while the experimenter stressed that they could use as much time as needed to make their decisions. Subjects were also free to walk to and fro to reinspect a specific task should they so desire. The procedure did not require the subjects to work on the task, but they were free to manually manipulate the tasks.

The results of this pilot study allowed the experimenter to determine 5 tasks with the highest discrimenatory component in terms of interest and perceived enjoyment for the tasks. A simple item analysis revealed that 5 out of the 30 tasks had a remarkably equal number of high and low choice scores. The description of the 5 tasks, and procedure of analysis is outlined in detail in Appendix.

STUDY 1

The subjects for this study were 75 undergraduate students drawn from the Faculty of Business Administration and the Dept. of Educational Psychology at the University of Alberta. Their ages ranged from 38 to 19 years, with a median of 23 years. There were 32 male students and 18 female students.

This preliminary study served to determine: (1) whether individually determined task choice and subsequent task persistence varied significantly from an independently established norm of task persistence across five tasks, (2) whether high and low individually determined task choice results in significant difference during a free-time period, and (3) to test the degree of relationship between self-report measures of task motivation and a behavioral measure of task motivation. The basic procedure parallels Deci's (1972) study with appropriate modifications. The study consisted of two phases. During phase one 25 subjects were assigned to the five experimental tasks without pre-testing or selection and measured on the amount of time spent manipulating the task (task persistence) during a 10-minute free-time period after they had worked on the task for a preliminary 10-minute time period. The mean time spent working on the task for this group of subjects represents the norm sample. Phase two consisted of randomly assigning a second group of 50 independently sampled subjects to high and low task motivation groups on the basis of self-choice (pair-comparison) and then comparing the means of these groups to the mean of the norm sample and each other.

Procedure

The following represents the experimental procedure for all three groups with the exception of the norm smaple where no pre-testing or self-choice procedure was initiated.

The experimenter escorted each subject to the experimental room and asked him to be seated at a table on which the five experimental tasks were located (jigsaw puzzle, watercolour set with paper and water, crossword puzzle, block construction task with designs, and practice course in business writing). The tasks were then presented to the subject by the method of paired-comparisons, providing standardized instructions (See Appendix 2 for a detailed description of the instructions). The experimenter asked the subject to point to the task he perceived as the most interesting and enjoyable on the basis of his feelings towards the task at the moment. Each task was paired once with every other task across successive trials. The ten possible pairings of tasks were presented in random order to minimize position and order effects. Based on the choice score, the five tasks were rank ordered from high to low interest value. The experimenter was doing this simultaneously during the presentation of tasks to the subjects. In this way, the pre-experimental level of intrinsic task interest for a particular task was individually determined.

The subjects were then randomly assigned to the treatment conditions. Half of the subjects worked on the task ranked as the least liked task and half worked on the task most liked. The experimenter randomized the choice of tasks in case of ties. Thus, two conditions of task interest were achieved. In this way, each experimental group consisted of a balanced distribution of all five tasks. This was necessary to ensure that groups varied only on the affective dimension of high-and-low-perceived intrinsic interest and not on behavioral and cognitive dimensions.

Following this, each subject was asked to relocate his position to an adjacent table and be seated. Here the subjects were told that they are taking part in an experiment on cognitive learning and that they will be asked to participate in performing a task. On the table in front of the subject the experimenter placed the experimental task. On this same table in the upper left hand corner a pile of recent magazines, consisting of a wide range of general interest topics, were located within easy reach of the subject. Directly to the subject's right on the table, were located the now remaining four tasks. To reach these the subject would have to stand up and reach over. Directly above and slightly to the rear of the sitting subject was located a speaker of the intercom system and a hanging microphone.

The experimenter asked the subject to fill out the rating forms with respect to the task in front of him prior to doing the task (see Appendix 3 for rating forms). During this time the experimenter left the room and observed the subject behind a one-way mirror. When the subject had completed the rating forms the experimenter returned, removed the forms and indicated to the subject that he would go behind the mirror to observe the subject (pointing to the exact spot) and provide the instructions over the intercom. The experimenter then left, located himself behind the one-way mirror and read the instructions to the subject (see Appendic 2). The subject then worked on the appropriate task for a period of 10 minutes. During this time two independent raters were recording unobtrusively the amount of eye and/or hand contact the subject made with the task. Pretesting indicated an inter-rater reliability of .99 (Pearson product moment correlation). At the end of this 10-minute period the experimenter indicated to the subject over the intercom that time was up and again read instructions. These instructions included that certain recordings were made and he (the experimenter) must leave the process this data. He told the subject that he may do anything he wished, but that he remain in the room until the experimenter returned, since more questions need to be asked depending on the data processing. The amount of time spent by the subject on the task during this 10-minute time period was the measure of subsequent task interest. In order to control completion as a possible causal factor, each task was designed to make completion impossible during the 10-minute period. In the case of the water colour painting where more than one picture could be completed in 10 minutes, depending on the subjects style, the subject was informed during the instructions for the first 10 minutes that he may paint as many pictures as he wished. At the end of the second 10-minute period the experimenter entered the room and gave instructions for the completion of the post-rating questionnaires which the subject completed in the experimental room (see Appendix 2).

Finally in order to control cross-subject contamination subjects were asked not to divulge the contents of the experiment to anyone. This was stressed by the experimenter, and all subjects seemed very cooperative in this respect.

Dependent Variable Measures

(1) The primary dependent measure consisted of time spent working on the task during the second 10-minute or free-choice period. The criteria for task persistence was eye and/or hand contact with any component part of the task in a sitting or standing position.

(2) Secondary dependent measure consisted of a number of rating scales:

(a) Semantic differential scales: These scales, developed by Calder and Staw (1975b), included affective, cognitive, and behavioral items. The overall scale consisted of 13 items (4 affective, 4 behavioral and 5 cognitive). The only modification to the scales deemed necessary was that all items were arranged randomly with respet to both order and direction of the scales to control for any tendency errors. Each item consisted of a 7-point scale (see Appendix 3).

(b) Perceived enjoyment and interest: Two Likert-type rating scales were utilized to measure perceived interest and enjoyment. One scale consisted of two 7-point summated Likert-type scales presented on a test-tre-test basis. The other consisted of a single 11-point Likert-type scale presented only on a post-treatment basis. These scales represent modification of scales utilized in a number of studies (see Appendix 3).

(c) Perceived effort: This scale consisted of a single 11-point Likert-type scale measuring the degree of perceived effort by the subject on a post-treatment basis (see Appendix 3).

(d) Perceived pleasure of work: This was a 0-1 data question where the subject indicated whether he perceived the task as work or pleasure. (see Appendix 3).

(e) Willingness to colunteer: This was also a 0-1 data scale where the subject answered either yes or no. (see Appendix 3).

STUDY 2

The subjects for this study were 64 undergraduate students drawn from the Faculty of Business Administration and the Faculty of Education at the University of Alberta. The ages from 30 years to 18 years, with a median of 22 years. There were 23 female students and 41 male students. The study was a Solomon four-group design to determine the effects of pre-testing on self-report post-tests and task performance. Performance is defined as the time spent on a task by the subject in a free-time situation over a 10-minute interval.

The design consisted of two levels of intrinsic motivation and four groups of test-re-test and treatment combinations. Subjects were randomized across all levels and groups. Therefore, the design was a level of intrinsic motivation by treatment factorial design with data collected as test-re-test and performance measures. Analysis consisted of two analyses of variance: First, a 4 x 2 analysis of variance of post-test scores across two levels of intrinsic motivation; second a 2 x 2 analysis of variance of performance scores across two levels of intrinsic motivation.

Prodecure

Experimental procedure paralleled that of Study 1 in every respect in the test-performance-re-test groups. Modifications were introduced in the remaining three groups to satisfy the criteria of a Solomon four-group design.

In the two (high and low intrinsic motivation) test-re-test no-performance groups procedure paralleled that of Study 1 with the exception that the experimenter asked the subject to remain in the room until he (the experimenter) returned to ask more questions. Again, the subject was told that he could do anything he wished, except leave the room, under the pretense of asking further questions after the data processing. The experimenter as in Study 1 took the completed pre-test rating form with him as he left. The procedure again paralleled that of Study 1 on entry of the experimenter after a 20-minute time period had elapsed. (see Appendic 2 for detailed instructions). In the treatment post-test only group the procedure again paralleled every aspect exactly as the test-re-test treatment procedure of the control group in Study 1. The only modification across both groups of high and low intrinsic motivation consisted of eliminating the pre-test procedure (see Appendix 2 for detailed instructions).

Finally, in the post-test only group procedures were modified to include the post-test ratings after the subject waited for the 20-minute time interval as in the other group (see Appendix 2 for detailed instructions).

Dependent Variable Measures

All dependent variable measures of study 1 were included with the exception of the perceived effort and the perceived enjoyment and interest scales, and the two 0-1 data scales since these were post-test instruments only and no reference to pre-test could be made.

STUDY 3

This study consisted of the major experimental investigation of five treatment groups across two levels of intrinsic motivation. Subjects were randomized across levels of intrinsic motivation by means of the previously (Study 1) defined paired-comparison procedure. Subjects were simultaneously randomized across treatment levels. The sample consisted of 144 undergraduate students at the University of Alberta. Ages ranged from 43 to 18 years with a median of 25 years. There were 97 male subjects and 47 female subjects.

Procedure

The experimental procedure was similar to the experimental procedure of Study 1. However, the treatment conditions required slight modifications in the both procedure and instruments. Subjects were informed over the intercom that they would receive their appropriate reward when the experimenter signalled that time has elapsed. At that point the subject would place the reward in an envelope and place the envelope in his pocket. Then the experimenter read the remaining instructions to the subject. The reward was located in an open drawer of the same table to the subject's left in full view of the subject at all times in order to ensure high saliency of reward. The drawer and evelope procedure was designed to control for a rater halo effect. However this was difficult to achieve as a number of subjects did not comply and placed their rewards into the envelope in full view of both raters. However, since the raters were naive and the hypothesized relationship was in the opposite direction of what common sense would dictate this did not seem to be a serious methodological problem (see Appendix 2 for detailed instructions).

Dependent Variable Measures

All of the dependent variable measures as descreibed in Study 1 were also utilized in this study. The primary measure consisted of time spent by the subject manipulating a task during a 10-minute free-choice period. Again, the criteria for working on the task consisted of eye and/or hand contact with the experimental task in both a sitting or standing position.

CHAPTER V

INDIVIDUAL TASK CHOICE: RESULTS AND DISCUSSION

RESULTS

To test for significant differences on the task persistence measure between high and low task interest groups (on the basis of individual task choice) and the norm sample, the data of study 1 were analyzed in a one-way analysis of variance (Anova) and a two-way analysis of variance with repeated measures. The first analysis tested the main effects of three levels of task motivation and the second analysis tested main and interaction effects of two levels of task motivation (A) and two rater measures of task persistence (B), treated as repeated measures.

The results of the first analysis (see Appendix 4.1) revealed a significant main effect for level of task motivation; $F(2,72)=5.78, p < .005$. Scheffe multiple comparison revealed that neither the mean of the high (454.65) or low (253.83) motivation groups differed significantly from the mean of the norm sample (305.14); $p=.06$ and $p=.71$. However, the analysis also revealed that the means of the high and low motivation groups differed significantly from each other ($p=.01$). The results therefore confirm hypothesis 1 but not hypothesis 1.1 and are consistent with the basic derivation from attribution theory that perceived task interest as measured by the paired-comparison procedure is directly related to task persistance in the absence of any external contingencies. Appendix 4.4 provides descriptive data of task distributions within the high and low motivation groups. Appendix 4.2 provides the means, standard deviations, and variance ratios.

The results of the second analysis (Appendix 4.3) also revealed a significant main effect for level of task motivation (A);F(1,48)=10.53,p <.005. These results, as were the results of the first analysis, are again consistent with and confirms hypothesis 1 that individually determined task choice and task persistence are related in the absence of external contigencies. Appendix 4.5 provides the means, and standard deviations of the two groups for the two independent raters.

In addition to these analysis inter-correlations of test-re-test measures of the high and low motivation groups were computed and then factor analyzed using a principle-axis rotation, varimax method (Kaiser, 1956). The varimax was used since it is both invariant under changes in the composition of a test series and satisfies the criteria of simple structure best. Thus, factors obtained by this method in a sample will have a greater likelihood of portraying the universe of varimax factors (Harman, 1967).

The results of the inter-test correlations (all pre and post measures) indicates that only two self-report measures correlate significantly with task persistance (see Appendix 4.6). Both the semantic differential scale-consisting of four affective 7-point scales (Test 2) and the summated pre-rating scale consisting of two 7-point Likert-type scales (Test 8) are signigicantly correlated with task persistence. However, although these correlations are significant they are also moderately low. Inspection of Appendix 4.6 also indicates that the test-re-test reliability coefficients (over a 20 minute time period) reach significance (test 2 to 9 inclusive). All of these correlations with the exception of the semantic differential consisting of cognitive scales are fairly high. Also, with respect to Appendix 4.6 two post-test only measures consisting of 0-1 data had too small a variance to compute a meaningful correlation coefficient (Test 12 and 13). Finally, the inter-rater reliability (computed seperately) indicates a significant correlation of .99 ($p < .001$).

Appendix 4.7 presents the results of the factor-analysis of the 13 tests and indicates four factors. The four tests with the greatest loading on intrinsic task interest are the semantic differential pre- and post-scales consisting of the four affective scales, and the pre- and post-summated rating scales measuring self-reported task enjoyment and task-interest. Interestingly, task persistance only correlated at a moderately low level to this factor. The tests of the second factor are the semantic differential pre-test, the two 11-point Likert-type scales measuring preceived effort and perceived interest and enjoyment. However, the cognitive post-semantic differential scale also correlated only moderately low with this factor. The third factor consisted mainly of the pre-and-post-semantic differential scales measuring perceived behavioral aspects of the task. Factor IV also seems to be a factor consisting mainly of the pre-and-post-semantic differential (cognitive scales), but also the subject volunteer test correlated quite highly with this factor. However, the interpretation of these factors because of the relative low sample size (N=50) necessitates a cautious bias.

DISCUSSION

The results of the analysis testing the prediction that individually determined task choice is a valid measure of free-time task persistance provide qualified support for the prediction derived from attribution theory that defines intrinsic motivation as (1) the perceived liking and enjoyment for a particular task, and (2) the amount of time a subject spends at an activity in the absence of any external contingencies.

The purpose of this study was to test this relationship between individually determined task choice and task persistance according to the following set of criteria: (1) absence of any salient or immediately indentifiable external contingencies (reward, experimenter, etc), (2) target activities (tasks) are avialable in a free-time situation, and (3) subjects had no expectation of any extrinsic reward. To the degree that these conditions were met by the experimental design the criteria for measured intrinsic motivation, as defined by attribution theory, have also been met. In conclusion the results provide strong support that individually determined task choice, as determined through a paired-comparison procedure, is a valid and reliable measure of level of intrinsic motivation as measured by task persistance within a free-time situation.

However, an interesting additional finding demonstrated that neither the high nor the low motivation groups differed significantly from a previously established norm group, although the results of the high compared to norm group were marginal. The major significance of this finding is relevant to the methodology of measuring intrinsic motivation. That is, the paired-comparison procedure did not result in a very low level of intrinsic motivation, at least not significantly lower than that of the norm sample. This may be of particular importance in the interpretation of results from study 3 since a "true" insufficiency condition is probably not being achieved by means of the present methodology.

Finally, the results of the correlational analysis and factor analysis of the self-report measures and task persistance scores revealed that only two of the rating scales are significantly correlated to task persistence (semantic differential-affective scales and the pre-rating scale consisting of two summated 7-point Likert-type scales measuring perceived interest and enjoyment). Previous research seems to be based on the assumption that task persistance and perceived interest and enjoyment are more highly related than this. The factor-analysis revealed four factors of which Factor I could be called a perceived intrinsic motivation factor consisting of the semantic differential-affective scales and the pre- and post-summated scale (above) as these are most highly correlated with this factor. However, task persistance does not correlate substantially with this factor. Keeping in mind that this data must be interpreted with caution since the number of subjects sampled was only 50 the results would seem to indicate that a behavioral measure like task persistance may not be part of the same factor measured by pre- and post-self-report measures of intrinsic motivation, as least in the absence of extrinsic rewards. This suggests the need for further research into the factor structure of dependent measures of intrinsic motivation.

In sum, the results of this study indicate that: (1) perceived liking and enjoyment for a task as measured by a paired-comparison procedure is a valid measure of task persistence during a 10-minute free-time period, and (2) that self-report attitudinal measures are not part of the same underlying factor of intrinsic motivation as defined by task persistance.

CHAPTER VI

TEST-RE-TEST EFFECTS: RESULTS AND DISCUSSION

RESULTS

To test the effects of pre-testing on both attitudinal self-report measures and a behavioral measure of intrinsic motivation the data were analyzed in two analysis of variance, according to a Solomun Four-Group design (Campbell & Stanley, 1963). The first analysis consisted of a 4x2 Anova of four self-report scales (Test 5,6,7 & 8) with four groups of test-re-test and performance combinations (A) and two levels of intrinsic task motivation (B). The second analysis consisted of a 2x2 Anova of task persistance data with two test performance groups (A) and two levels of task motivation (B).

Appendix 5.1 and 5.4 inclusive provides the results of the first analysis.

Four test-re-test main effects (A) were significant and one motivation level main effect was significant (B). Also one interaction effect was significant for the pre-semantic differential (affective) test.

Semantic Differential Measure (Affective Scales):

The Anova revealed significant effects for test-re-test-performance orders (A); F(3,56)=7.11, p <.001; for motivation levels (B); F(1,56)=60.79, p <.001; and for Order (A) x Motivation level (B) interaction; F(1,56)=5.56, p

<.005.

Semantic Differential Measure (Behavioral Scales):

For the data of this semantic differential scale the Anove revealed significant effects for motivation level (B); F(1,56)=18.78, p <.001; and Order (A) x Motivation level (B) interaction; F(1,56)=2.68, p <.05.

Semantic Differential Measure (Cognitive Scales):

This measure revealed only a motivation level (B) significant effect; F(1,56)=11.40, p <.005.

Summated Rating Scale (Liking and Enjoyment Scales):

This measure also revealed only a significant motivation (B) level effect; F(1,56)=41.44, p <.001.

A Posteriori Comparisons:

Because of the significant order and interaction effects for two of the semantic differential (affective scales, behavioral scales) measures, Scheffe a posteriori multiple comparison tests (Kirk, 1969) were conducted to test for the specific test-re-test-performance (order) effects. Appendix 5.5 summarizes the results of this analysis. From a general inspection of this table it is evident that within the high task motivation groups all measures do not seem to be affected by pre-testing. However, in the low task motivated groups the semantic differential (affective and behavioral scales) show significant pre-test-performance effects. Within the high task motivated groups only one significant effect was revealed in relation to the semantic differential consisting of behavioral scales. Appendic 5.6 provides the means and standard deviations of the significant order effects.

The results of the second Anova (see Appendix 5.7) testing the effects of pre-testing on task persistance showed only a significant motivation level (B) effect, F(1,28)=23.05, p <.001; and no significant order (A) effect; F(1,28)=1.54, p <.05; nor Order (A) x Motivation level (B) interaction effect; F(1,28)=1.04, p <.25. The means and standard deviations of the significant motivation effects are listed in Appendix 5.8.

DISCUSSION

The analysis revealed that pre-testing on attitude self-report measures does not significantly affect task persistence. However, two of the self-report measures (semantic-differential affective and behavioral scales) were significantly affected by pre-testing, performance, and pre-test-performance interaction. These results are therefore relevant to the interpretation of the findings in study 1 and study 3 in two ways: First, the results provide additional support to the findings in study 1 that task persistance and the various attitude measures do not tap the same inderlying factor, since task persistence is relatively independent of attitudinal pre-test effects. Secondly, the significant test-re-test effects on two of the attitude measures necessitate a cautious interpretation in study 3 with respect to these measures as dependent measures of subsequent intrinsic motivation.

CHAPTER VII

REWARD MAGNITUDE AND REWARD CHOICE: RESULTS AND DISCUSSION

RESULTS

The major independent variables under consideration in this study were: (1) reward magnitude (large and small monetary reward) (2) reward choice, and (3) reward deprivation. Initial level of intrinsic task motivation was treated as an independent variable (high interest and low interest) and determined by means of the previously validated paired-comparison procedure. The primary dependent measure of intrinsic movivation was task persistance over a 10-minute free-time period. Also, secondary measures of intrinsic motivation consisted of six self-report attitude measures. The relative importance of both classes of dependent variable measures was pointed out earlier (study 1). The predictions are formulated primarly with reference to the behavioral measure of intrinsic motivation.

The data were analyzed in a 2x5 analysis of covariance (Ancova) covarying over test-performance-re-test scores. The analysis of covariance tests the significance of the differences among means after controlling initial differences between groups on the covariate measures, tehrefore taking the degree of relationship between the covariates and the dependent measures into account

(Kerlinger, 1973). This allows for a more accurate reflection of dependent measure scores between experimental groups (Munally, 1975). In the present study individuals were assigned randomly to groups, pre-tests were administered, the experimental treatments were applied (reward conditions), and both post-test measures and a task persistance measure taken. However, random assignment to groups does not ensure that the groups have equal means on all pre-test measures. Therefore, part of the observed post test differences among groups may arise from chance differences in the pre-test; or, important differences in the post-test means may be masked by the chance differences in the pretest.

To summarize, two sets of independent measures were collected: (1) a behavioral measure of task persistence over a 10-minute free-time period following the administration of reward conditions, and (2) attitudinal self-report measures collected at the end of the 10-minute free-time period. The data from each of these measures are considered seperately in the following sections.

Behavioral Measure of Intrinsic Motivation:

Of primary interest was the amount of time the subjects spent when they beleived their behavior was no longer being monitered. The mean time spent for each subject group is provided in table 1. The results of the Ancova are summarized in table 2. Only the reward conditions (B) reached significance; $F(4,130)=6.16$, $p <.001$. Neither motivation level (A); F(1,130)=1.16, p >.25; nor Motivation (a) x Reward (B); F(4,130)=1.48, p >.05, reached a significance level. Since, Scheffe multiple comparisons of treatment means reflect only differences among the average of two means for each treatment it was necessary to again do Scheffe a posteriori individual comparisons of means within each motivation level to determine which treatments resulted in significant change on the dependent variable measures from the control groups means and from each other. To calculate Scheffe a posteriori comparisons use of the adjusted means and MS error 2 was necessitated since the original analysis was an Ancova (Kirk, 1968, p. 482).

To test the hypothesis that the high reward group will display less subsequent intrinsic task behavior than the low reward group a posteriori comparisons compared the two conditions whithin the initially high task interest group. This comparison failed to reach significance (F <1). Therefore the prediction that a larger reward will result in a greater decrement in subsequent intrinsic motivation than a smaller reward was not confirmed. Similarly, in the case of the initially dull task the hypothesis with respect to the two reward conditions of differing magnitude failed to be confirmed as the difference between their means also did not reach significance (F <1).

Interestingly, both the high and low reward conditions showed significantly less task persistence however than the no-reward control group within the initially high interest

TABLE 1

MEAN TIME IN SECONDS OVER A
10-MINUTE FREE TIME PERIOD

	High Task Motivation		Low Task Motivation	
	Mean	S.D	Mean	S.D
TD	239.14	271.70	236.27	259.26
TC	222.55	273.28	165.30	261.73
DP	440.25	162.45	249.47	219.49
CH	300.00	258.06	182.02	284.62
CO	543.50	103.51	299.38	242.83

Note. TD = Two dollar reward condition

TC = Twenty-five cents reward condition

DP = Deprivation reward condition

CH = Choice reward condition

CO = control reward condition

TABLE 2

SUMMARY ANCOVA TABLE FOR TASK PERSISTENCE

DATA: 2 (GROUPS) x5 (LEVELS)

Source	df	MS	F	p
Motivation Level (A)	1	57528.379	1.158	p >.25
Reward Conditions (b)	4	305960.750	6.159	p <.001
Motivation x Reward (AxB)	4	73542.813	1.480	p >.05
Motivation-Reward Within Groups	130	49671.824		

task; F(4,150)=10,38, p <.001 (high reward); F(4,150)=15,41, p <.001 (low reward).

With respect to reward choice, both initially interesting and less interesting task groups showed significantly less task persistance than their respective no-reward controls; F(4,180)=17.28, p <.001 (high task motivation); F(4,180)=13.57, p <.001 (low task motivation).

Finally, neither of the two deprivation conditions (high and low task motivation) revealed a significant difference from the no-reward control groups. These results are graphically displayed in figure 1.

Attitudinal Measures of Intrinsic Motivation

The remaining dependent variables concern the subjects' perceptions of various aspects of intrinsic interest as measured by several self-report scales. A questionaire including the previous pre-test measures and four additional post-test only questions was administered after the 10-minute free-time period.

Appendix 6.1 to 6.6 inclusive provide the results of the Ancova of all secondary measures of intrinsic motivation. Only the following means of the secondary measures showed a significant difference from the control group means: (1) post-test summated rating scale mean (4.63,S.D.=.71) and control mean (2.80,S.D.=1.38) for low task interest and high reward; F(df=4,150)=45.23, p <.001; (2) post-only rating scale mean (5.23,S.D.=1.83) and control

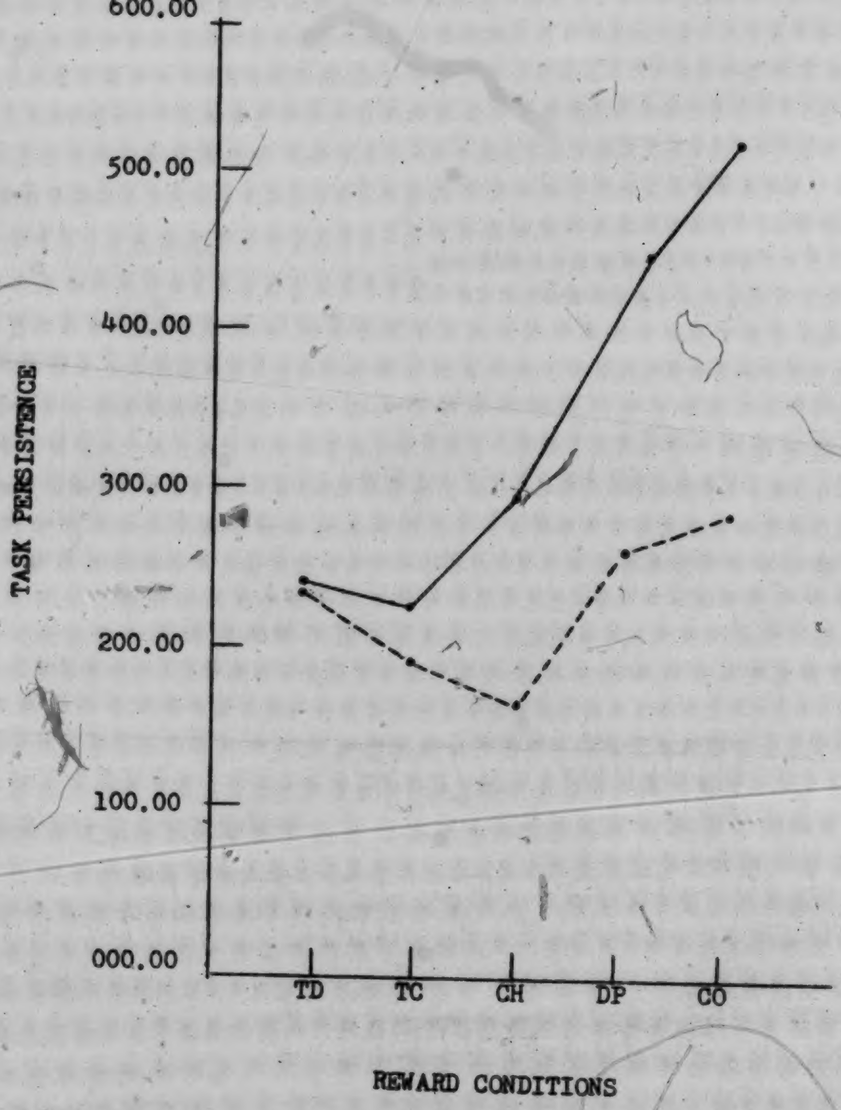

FIGURE 1

MEAN VALUES IN SECONDS FOR REWARD CONDITION GROUPS (TD = TWO DOLLARS, TC = TWENTY-FIVE CENTS, CH = CHOICE, DP = DEPRIVATION, CO = CONTROLS, •——• = HIGH TASK MOTIVATION, •- - - -• = LOW TASK MOTIVATION).

mean (6.36,S.D.=1.57) for low task interest and low reward; F(df=4,150)=3.03,p <.025; (3) post-only rating scale mean (5.10,S.D.=2.14) and control (6.36,S.D.=1.57) mean for low task interest and deprivation reward condition; F(df=4,150)=3.64, p <.005; (4) post-only rating scale mean (4.32,S.D.=1.36) and control mean (6.36,S.D.=1.57) for low task interest and choice reward condition, F(df=4,180)=36.95, p <.001, (5) post-only rating scale mean (7.46,S.D.=1.29) and control mean (6.91,S.D.=1.23) for high task interest and choice reward condition; F(df=4,180)=3.23, p <.025; and (6) post-effort scale mean (8.24,S.D.=1.54) and control mean (6.67,S.D.=1.59) for high task interest and low reward condition; F(df4.150)=2.92, p <.05. All of these results are in the opposite direction from that predicted.

Finally, a second correlational and factor analysis was conducted on the data for all the dependent measures intrinsic motivation (see Appendix 6.7 and 6.8). As in the first factor analysis the tests for Factor I (perceived intrinsic task interests) consist of tests 2 and 5 (pre- and post-semantic differential affective scales) and tests 8 and 9 (pre- and post-summated rating scale consisting of two 7-point Likert-type scales measuring perceived task enjoyment and interest). Interestingly, inspection of Appendix 6.8 shows a slight shift on Test 1 (task persistance) towards a lower correlation with Factor I. Factor III and IV were loaded by pre- and post-semantic differential measures (Factor III - behavioral scales and Factor IV - cognitive scales). However, an important shift in the factor structure of Factor II occurred. This Factor was loaded with Test 9 (post-summated enjoyment and interest scale), Test 10 (post-perceived enjoyment and interest scale), Test 11 (post-perceived effort scale), Test 12 (work-leisure question), and Test 13 (volunteer again question). The condition common to all of these tests is that they were administered after the experimental treatment conditions were presented and therefore on a post-experimental basis only. Interestingly Test 1 (task persistance) correlated highest with this factor, although still only moderately low.

DISCUSSION

The data of the third study, designed to test the effects of four different reward conditions in both high and low intrinsic task motivated groups revealed strong main effects of extrinsic reward on intrinsic motivation as measured by task persistance. For the high intrinsically task motivated groups, task persistance during a free-choice period decreased significantly below that of the high motivation control group, with the introduction of a $2.00, 25¢, and choice reward condition. However, the predicted effect of reward magnitude on subsequent intrinsic motivation was not confirmed. This suggests that a less desirable extrinsic reward has the same potency in under mining intrinsic motivation than a more desirable reward, assuming that $2.00 is more desirable than 25¢. This seems to be somewhat contradictory to the findings in the Lee, Syrnyck and Hallschmid (1976) study where the desirability of extrinsic reward was found to significantly interact with level of task motivation. It also raises some interesting questions with regards to quantitative versus qualitative differences of reward and timing of reward choice. In the Lee, et al (1976) study subjects were randomly assigned to either high or low extrinsic reward conditions based on individually determined rather than group validated, reward choice. First of all, the rewards were varied on a set of qualitatively different extrinsic reward dimensions. Secondly, the choice of reward and therefore determination of reward desirability occurred prior to task manipulation by the subjects. This may in part be related to the significant Task x Reward interaction found since reward desirability was maximized but choice itself seperated from the total reward complex. This suggests that attributions were formed on the basis of perceived desirability of extrinsic reward in the Lee, et al (1976) study, and confirms the attributionally derived hypothesis that a more desirable reward and therefore more salient reward would focus the individual's attention outward away from the task. Similarly, in terms of competing response effects the more desirable reward would act as a more potent distraction than the less desirable reward. This raises the question of why the small reward (twenty-five cents) condition in the present study resulted in virtually the same decrement in intrinsic motivation as the large (two dollar) reward, given the assumption that the smaller monetary reward was perceived as less desirable by the subjects. Deci (1973) and Ross (197) have suggested that a small reward could provide negative feedback regarding task success. In this light a small or negligable reward could act as a status threat and mediate the effects of reward on task interest either by: (1) mediating a relatively persistant negative effect that becomes associated to the task or, (2) by providing negative feedback to the subject with respect to task competence. However, both of these effects occur only when rewards are allocated on a success contingency basis. The present experimental procedure was designed to reduce the likelihood of negative feedback regarding task success by allocating rewards on a performance contingency basis only.

One possible explanation that has as jet not been suggested in the literature could be referred to as input saliency or forced attentiveness. A common criterion for the existence of cognitive dissonance for example is the length of time it takes a subject to make a decision. Jecker (1964) has found that as dissonance increases, decision time also increases. Similarly, the divergent perceptions by subjects within an overjustification situations could lead to the subject examining the situation and making decisions as to the appropriateness of the rewards and the desirability of the rewards. This heightened attentiveness may be a concomittant effect that subsequently heightens the saliency of stimulus cues. That is, under the effects of heightened attentiveness or vigilance the subject may notice more subtle cues increasing the saliency of rewards. Although this is only speculation and remains to be investigated empirically a heightened attentiveness effect may explain not only why a small and presumably less salient reward is as potent in decreasing subsequent intrinsic motivation as a larger more salient reward, but also may have relevance in relation to the whole extrinsic reward issue. Heightened attentiveness does not need to imply that percieved changes in locus of causality will occur. The question of percieved change is largely dependent on what the subject becomes aware of which could change the psychological meaning of the situation for each subject. Even, if a stimulus is inconsequential, it may become more noticed under certain situations resulting in a different orientation towards the task. This may be particularly relevant to brief time periods as in most of the intrinsic motivation studies.

Finally, the high or low motivated tasks were individually assigned, and not group validated. Because subjects worked on the lowest task of their choice, it seems reasonable to suspect that a dissonance effect may have offset the usual incentive effect of extrinsic reward on the low task motivation condition (Calder & Staw, 1975b) or, the mean of a sample of subjects in the low task motivation groups as in the validation study was not significantly different from the previously established behavioral norm and thus did not represent a truly low (dull) motivation level. This represents one of the major advantages of the methodology devised in the present study. More specifically, comparison to an independently established behavioral norm allows the determination of what could turn out to be a relevant task characteristic -- level of task interest in relation to the behavioral norm. This would allow empirical investigation not only across the entire justification curve but also of cross-sample comparisons to help determine if the observed relationship between intrinsic motivation and extrinsic reward is a more or less consistent. However, the finding remains that the negative effect of extrinsic reward on an intrinsically interesting activity is not dependent on reward magnitude.

For the choice reward conditions, where both task and reward magnitude were individually determined, the results demonstrated that an externally imposed reward choice can result in subsequent decreases in intrinsic motivation. Compared with subjects in the no-reward control groups, subjects in the reward-choice conditions, whether they chose money or no-money, showed a decrement in intrinsic motivation. However, further analysis also revealed a significantly greater decrease for the money choice group versus no-money choice group (see appendix 7).

The actual quantity chosen may have been determined by an individual difference factor (social desirability factor, or task relevance factor). Since subjects were assigned to these groups on the basis of their choice behavior no valid conclusions can be drawn with respect to cause-effect relationships. The results only suggest that either an individual difference factor or a shift in locus of causality based on reward-choice decreased subsequent intrinsic interest. However, the finding remains significant and important and awaits further empirical investigation.

It is difficult to reconcile these findings within either a pure attributional or competing response framework. Perhaps both processes are operative in the simultanious presence of task intrinsic and extrinsic rewards, and a conceptual framework that formulates these underlying processes on a complimentary basis would be a more fruitful position to take. Perhaps a more appropriate question is not whether one model should replace the other, but under what conditions the two processes compliment or counteract each other. On the basis of these findings and earlier research a justifiable assertion is that further isolation of important variables at the theoretical level can result in fruitful empirical investigation of the underlying psychological process involved in overjustification situation. At least to this investigator it seems premature to adopt a closed system perspective and more appropriate to attempt to isolate further important variables (e.g. situational) to generate experimentally testable hypothesis with a view to incorporate them into a more comprehensive model.

The competing response hypothesis suggests that there are any number of possible effects (e.g. performance anxiety, delay of reward frustrations, approach-approach attentional conflicts, etc.), so that control of one does not rule out the possibility of another operating in the experimental setting (Reiss & Suschinsky, 1975). Therefore, it might be argued that the choice of reward situation represents an approach-approach attentional conflict between two positive stimuli (Reiss & Suschinsky, 1975) which could be highly distracting and aversive. Granted that there was significant reduction in task presistence in the no-money group, it remains improbable that the money versus no-money groups would not be exposed to the same aversive stimuli were one to adopt this position. Also, none of the subjects on an open-ended post-experimental questionnaire made any reference to such a conflict or any concommitant anxiety. Indeed, most of the subjects made reference to a social desirability factor (e.g. "no one wants to look cheap").

The question of transfer of environmental reward expectancy from training to testing situations does not seem to be an issue in this study either since the experimenter clearly indicated that: (1) the experiment is over, (2) that he would leave for a short period of time to process data, and (3) that he would return only to ask further questions. Thus the non-recurance of behavior in the rewarded groups and recurance of behavior in the control groups does not seem likely to be function of an expectation factor.

Finally, the criticism that reduced task persistence is due to a performance anxiety effect (Reiss & Suschinsky, 1975) again seems inconsistent with the highly probable assumption that there would be little difference in the perceptions of the choice reward subjects to differentially regard the task as evaluative since the experimenter stressed in his instructions that the money should not be dependent on task performance.

The important finding remain, that reward magnitude is not a critical factor in undermining intrinsic task persistence, but that choice of monetary reward is.

With respect to reward magnitude a puzzling finding is the lack of any evidence for the predicted dissonance and reward effect. A possible alternative explanation is that a true under-justification condition did not exist since neither high nor low extrinsic reward affected subsequent intrinsic motivation significantly, but did show a non-significant decrease.

Finally, the intercorrelations and factor-analysis of the same set of variables after reward treatments had been introduced (n = 144) revealed an interesting shift in the factor structure. Task persistance now correlated to a higher degree with a factor consisting of all of the post-experimental rating measures. This correlation was still relatively low however. Causal generalization of course is not warranted, however; task persistance and self-report measures seem to be less correlated in the absence than in the presence of extrinsic rewards. A more directly obvious explanation however for the observed factor shift lies in the properties of the tests themselves (Guilford, 1954). Factors obtained from pre- and post-treatment scales may not be identical to factors obtained from post-treatment only scales. This becomes even more likely when taking into account the results of the second preliminary study which indicated significant pre-test effects in the semantic-differential (affective and behavioral) scales. This in part at least could account for the slightly higher correlation of task persistance with Factor II (post-treatment only scales) since the post-test rating scales may be more immune from pre-test effects. However the results would suggest the need for further investigation into the underlying factors of intrinsic motivation measures and their hypothesized relationships under the influence of and in the absence of extrinsic rewards.

One of the main limitations of this study is that no direct measure of attributions was devised. The main reason for this was to avoid cross-subject contamination because a number of subjects were drawn from the same faculties. No satisfactory unobtrusive rating scale or questionnaire was devised. This represents a problem for further investigation. It would be valuable to replicate the choice reward condition using a greater number of subjects for the sample and devising an instrument to measure attributions directly. These results represent important findings in light of research that indicated that perceived control over the environment is reinforcing (Weiner & Dubanoski, 1975).

Presumably having a reward choice is conducive to perceiving greater control over the environment.

A second limitation relates to the sampling procedure of the three studies. Comparison of control group means to the previously established behavior norm violates the assumption that both samples be drawn from the same population since the time span involved cuts across two semesters. This limitation does not allow a direct comparison of group means to the previously established behavior norn (study 1) to determine if a true underjustification condition existed in the low task motivation groups. As stated above this was hypothesized to occur since subjects worked on the least liked task as established by the paired-comparison procedure. In future research utilizing this methodology, a number of precautions could be observed: (1) tasks that have a very low intrinsic interest value could be added to the experimental task list, and (2) subjects could be assigned their second or third choice to extablish three levels of task intrinsic motivation (high, low, and medium). This would allow research across the entire justification curve to observe changes in the extrinsic-intrinsic motivation relationship and represents a new methodology for research on intrinsic motivation.

The reward deprivation condition did not have any significant effect on task persistence during the free time period in high or low motivated task groups. To reiterate, no specific predictions were made regarding the effects of this variable on intrinsically task motivated behavior. However, the variable has some relevance to Adam's (1963) inequity theory in relation to self and other ratio of imputs and outputs comparisons. Since the subjects did not perceive, however, any relationship between their behavioral inputs and monetary outputs (reward) this cannot be considered to be a true inequity situation. Only the operation of a purely cognitive deprivation variable was observed. Interestingly, the methodology utilized could be modified to develop tests of the effects of inequity on high and low task motivation provided the induction variable is introduced to insure an inequity condition exists as outlined by the theory.

The findings of this series of studies generally provide further support for the attributional analysis of the relationship between extrinsic and intrinsic motivation. However a number of interesting questions are also raised that require further investigation.

The first finding relates to the underlying factor structure of intrinsic motivation. This underlying structure may be more complex than previously assumed. Perhaps a fruitful line of direction would be to consider task persistence and various types of self-report measures as measuring seperate factors.

Secondly, the finding that reward magnitude is not significantly related to the degree to which extrisic reward undermines task motivation raises further questions in light of the Lee, et al (1976) finding that desirability of reward is a significant variable. Future investigation could manipulate reward magnitude across a much larger range as was done in the dissonance literature. A second research direction would investigate quantitative versus. qualitative reward components (i.e. consummatory vs. monetary reward). Perhaps the factor structure of extrinsic reward components would provide some interesting research leads also.

Third, the question of self-choice of extrinsic reward magnitude could be further investigated by employing a larger sample of subjects, measuring attributions directly, and isolate the individual difference factor.

As explicated above research across the entire justification curve would provide a more comprehensive analysis of the relationship between extrinsic and intrinsic motivation.

Finally, the effects of reward deprivation would lead to an investigation of equity theory operating under low and high task motivation provided the induction factor is carefully considered.

CHAPTER VIII

CONCLUSIONS

Most of the research on the effects of extrinsic rewards on intrinsic motivation have provided relatively consistent evidence in favour of attributional and self-perception phenomena. However, one distinguishing feature in this research is that the extrinsic reward has always been disigned to be highly salient to the experimental subjects. Most of the empirical evidence shows that when, and only when, the extrinsic rewards are salient does subsequent intrinsic motivation decrease. This has raised the possibility of competing response effects as an alternative explanation to self-perception and attribution phenomena. The finding that expected salient, and tangible rewards decrease subsequent intrinsic motivation, whereas unexpected, social, and less salient rewards do not, is consistent with the competing response explanation. Therefore, at the present time all of the empirical findings reviewed can be understood in terms of both attributional and self-perception processes or competing response effects.

The present study was designed to test several such hypothesis derived primarily from attribution theory, but explicable also in terms of competing response effects. However, the main rationale for the study is found in several issues that had remained unexplored up to this point. First, all of the previous empirical studies had employed group validated experimental tasks. In the present study tasks were individually chosen from a group or set of tasks to maximize the feeling of self-investment or commitment to the task which is assumed to be intimately related to intrinsic task motivation. The results clearly indicate that individual task choice is directly related to task persistence during a free-time period. This provides strong evidence for the validity of this procedure to determine level of intrinsic motivation in the absence of external contingences. However, with respect to attitudinal (self-report) measures of intrinsic motivation it was found that task persistence did not correlate highly with these measures. Furthermore, a factor analysis showed that these measures are not part of the same underlying factor in the absence of extrinsic rewards. This is a surprising finding since attitude and behavioral measures are frequently used interchangeably as dependent variable measures of intrinsic motivation. However, one qualification to this is that on the introduction of external reward contingencies the post-test only measures correlated to a slightly higher degree with the behavioral measure, than in the absence of rewards. Both measures also loaded to a slightly higher degree on the same underlying factor in the presence of external rewards, than in their absence.

These findings throw some doubt on the fundamental assumption that attitudinal and behavior measures of intrinsic motivation tap or measure the same underlying states at all times. Possibly, the Doob (1947) and Bandura (1969) argument that attitudes are learned predispositions to respond or learned mediating responses is a more appropriate way of conceptualizing the relationship between attitudinal and behavior measures of intrinsic motivation. Particularly, in the presence of individual task choice there may be as yet several undetermined processes that cause individuals to display different learned responses despite the similarities as reported on the attitudinal measures. However this remains highly speculative and suggests the need for further research into the underlying factor structure of measures of intrinsic motivation.

The second major question investigated in the present study is related to the effect on intrinsic motivation of extrinsic monetary rewards of differing magnitudes. All of the previous empirical studies had contrasted only the effects of a salient reward with no reward. This left a gap in the empirical literture because of the untested attributional derivation that the larger the extrinsic reward the more likely subsequent decrements in intrinsic motivation. Conversely, it left untested a second derivation from attribution theory that a minimally salient or neglibable reward would not decrease intrinsic motivation. Given the all or none nature of the attributional process a minimal reward could even lead to subsequent increase in intrinsic motivation. These predictions were not confirmed as both a relatively larger reward and small or neglibable reward were found to have the same detrimental effect on subsequent intrinsic motivation.

It might be argued that subjects were responding to the informational aspect of a small extrinsic monetary reward. In other words, a small extrinsic reward could convey negative feedback or have negative cue value. However, it will be remembered that the experimental design attempted to ensure that subjects would not percieve the rewards contingent on any success criteria. The data, therefore, would not seem to provide any evidence for this explanation, since both rewards (high and low) were contingent only on performing the task and not on task success.

A possible explanation presented here for future investigation is what may be called a heightened attentiveness effect or forced attentiveness effect, which has only been explored in relation to dissonce phenomena so far (Jecker, 1964). Within an overjustification situation subjects may be responding to a number of divergent perceptions of various stimuli, examining the situation and making decisions as to reward appropriateness, experimenter motivation, and so forth. This may lead to heightened attentiveness which in turn raises the saliency of various stimulus cues. Thus, heightened attentiveness may lead to an increase in the saliency of even a small or initially minimally salient reward. Interestingly, this effect is consistent with the empirical evidence that reward saliency mediates the effects of extrinsic reward through reward visibility or the subject's attentional focus (Ross, et al, in Press, Ross 1975). However, this also remains highly speculative and awaits further empirical investigation.

Finally, the effects of an externally imposed or experimenter imposed reward choice on subsequent intrinsic motivation was investigated. Experimental eveidence was cited indicating that self-reinforcement leads to greater resistence to extinction (Weiner & Dubanoski, 1975). However, in the intrinsic motivation literature the effects of self-reward had been left unexplored up to this point. Therefore the effects of externally imposed self-reward on subsequent intrinsic motivation were observed with two interesting findings: (1) externally imposed reward choice leads to reduced intrinsic motivation, and (2) the money choice versus no-money choice group showed a significantly greater decrease in subsequent intrinsic motivation. The reward choice again was also contingent only on performing the task and not on task success. Interestingly, both the money-choice and no-money choice groups showed a significant decrease in intrinsic motivation. This finding would seem to support the overjustification hypothesis since in either case the subject would perceive himself undertaking the task as a means to achieve the reward choice. However, forced attentiveness could also act as an alternative explanation in this case since subjects may presumably be even more prone to examining the experimental situation and make decisions as to the appropriateness of their reward choice.

Finally, the finding that the money choice group showed the greatest decrease in intrinsic motivation suggests an area for further research. There are three possible explanations for this result: (1) A possible shift in locus of causality as a result of the reward choice, (2) An individual difference factor, and (3) An interaction between the two. Because subjects were assigned on the basis of self-selection it is not possible to draw any valid conclusions as to causality. However, the finding remains interesting and important enough to warrant further research.

In sum, whereas the data of the present study provides some significant support for the hypothesis that both monetary extrinsic rewards and monatary reward choice per se leads to subsequent decrements in intrinsic motivation, the results failed to reveal the expected difference between extrinsic rewards of different magnitudes. Also the findings with respect to measures of intrinsic motivation raise some doubt as to whether attitudinal and behavioral measures tap the same underlying state in all situations.

However, the study also demonstrates the utility and validity of a paired-comparison procedure for future research across the entire justification curve. Also in terms of future research the findings point to a possible individual difference factor that could be investigated in relation to reward choice. Undoubtedly, there exist individual differences that have as yet not been systematically explored.

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APPENDIX 1

DESCRIPTION OF EXPERIMENTAL TASKS AND PILOT STUDY RATING FORMS

INSTRUCTIONS

A. Pilot Study Instructions*

This is a list of the various puzzles, games and tasks that you are asked to rate. The numbers in the left column (column 1) correspond to the task or the puzzle displayed. Please familiarize yourself with each of the tasks by reading the brief instructions above the tasks. You may also manipulate each task for this purpose. Once you have done this choose the three tasks you find the _most_ interesting and enjoyable and then the three tasks you find the _least_ interesting and enjoyable. Check off your choices in the boxes opposite to the task.

Note: *The Headings A and B are for the benefit of the reader only and were not included on the original questionnaire in the pilot study.

TEST RATING FORM

B. Pilot Study Rating Form

Task No.	Most interesting and enjoyable	Least interesting and enjoyable
	1. _____	1. _____
	2. _____	2. _____
	3. _____	3. _____
	4. _____	4. _____
	5. _____	5. _____
	6. _____	6. _____
	7. _____	7. _____
	8. _____	8. _____
	9. _____	9. _____
	10. _____	10. _____
	11. _____	11. _____
	12. _____	12. _____
	13. _____	13. _____
	14. _____	14. _____
	15. _____	15. _____
	16. _____	16. _____
	17. _____	17. _____
	18. _____	18. _____
	19. _____	19. _____
	20. _____	20. _____
	21. _____	21. _____
	22. _____	22. _____
	23. _____	23. _____
	24. _____	24. _____
	25. _____	25. _____
	26. _____	26. _____
	27. _____	27. _____
	28. _____	28. _____
	29. _____	29. _____
	30. _____	30. _____

BRIEF DESCRIPTION OF EXPERIMENTAL TASKS

1. Jigsaw Pizzle - This was a regular 500-piece jigsaw puzzle with a coloured pastural scene.
2. Water Colour Set - This included seven cakes of colours including white, a stack of white and coloured paper, two seperate cups of water and two brushes.
3. Crossword Puzzle - This task consisted of a regular 40-60 word crossword puzzle mounted on a white paper background.
4. Block Design - This task consisted of 100 coloured cubes (2 centimetres square) which subjects arranged according to 30 three-dimensional designs.
5. Business Writing - This task included a series of diverse writing tasks (e.g. letter writing, memo writing, spelling, etc.).

APPENDIX 2

MAIN EXPERIMENTAL INSTRUCTIONS

EXPERIMENTAL INSTRUCTIONS

Study One

The subjects came individually to the testing room from a waiting area nearby. Upon entering the testing room, each subject was seated at a table upon which the five experimental tasks were located in a row directly in front of the subject. At this point the experimenter sat himself behind the table directly facing the subject and began:

"My name is Mr. Hallschmid. Before we start I would like to present to you a series of two tasks, and in each case I would like you to point to the task, of each pair that I place in front of you, that you find the most interesting and enjoyable on the basis of how you feel at the moment."

If the subject had no questions, the experimenter continued and presented the pairs of tasks and recorded choices on a worksheet (see Appendix 3) which was placed out of view of the subject. Once all possible randomized pairs had been presented the experimenter continued:

"Thank you, now would you please sit over here (pointing and escorting subject to the other end of the table)."

The experimenter placed the appropriate task in front of the subject together with the rating scales:

"Now would you please fill out these questions, as soon as you have done so I will return and give you the rest of the instructions."

If the subject had no questions the experimenter left and observed the subject through the one-way mirror until the subject had completed the rating:

"Alright, thank you. Now I will go into that room (pointing to the appropriate spot) and give you your instructions over the intercom."

Once the experimenter had reached the monitor room he continued and provided the instructions over the intercom:

"Please look at the task in front of you. I will ask you to start working on this task in a minute. You may work on the task in any way you think is appropriate until time is up. Are there any questions before we begin? Alright you may start now."

Now was an audio cue for the two independent raters to begin timing. The subject worked on the task for a 10-minute interval at which point the experimenter would interrupt over the intercom:

"Alright (rater cue) time is up. I have made some recordings while you were working on (the task) and have to leave for a while. You may do anything you like until I return, but please remain in the room since I will probably ask you some more questions when I return. Thank you." (Rater cue.)

Experimenter left and walked down a long hallway. Raters now recorded task persistance during a 10-minute time interval which was the primary dependent measure. Within the experimental room the subject had access to the task he had worked on, the remaining four tasks, and distraction stimuli (magazines). At the end of the 10-minute interval the experimenter entered the room (rater cue) and continued:

"Thank you for waiting. Before you leave I would like you to fill out again these questions."

Once the subject had completed the rating scales the experimenter terminated the experiment with a few questions and debriefed the subject to the extent possible at this time. All subjects were asked not to disclose the contents of the experiment to their classmates or friends at university.

Study Two

Slight modifications had to be introduced in conformance with the parameters of this study. When subjects did not work on a task the experimenter indicated he would leave to process some data and asked the subjects to stay in the room as in the above instructions. These were the only modifications necessary. Finally, in the performance post-test group subjects were asked to work on the appropriate task over the intercom without prior rating.

Study Three

The only modifications necessary from the main experimental procedure of Study One revolved around the presentation of the monetary reward. The experimenter read the instructions over the intercom in accordance with each reward condition as follows:

(1) High and low reward conditions

"Please look at the task in front of you. I will ask you to start working on this task in a minute. You may work on the task in any way you think is appropriate until time is up. (At that time I would like you to take the two dollars (Twenty-five cents) in the drawer to your right. The money will then be yours. Please note that receiving this money is not contingent on how you perform on the task. It is only contingent on you working on the task until I tell you time is up.)"*

After the subject had worked on the task for 10-minutes the experimenter interrupted over the intercom:

"All right time is up. (Please take the two dollars in the drawer, place the money in the envelope and place it in your pocket. The money now belongs to you.)"

* Raters were unable to hear the bracketed statements.

(2) Choice condition

"Please look at the task in front of you. I will ask you to start working on this task in a minute. You may work on the task in any way you think is appropriate until time is up. (At that time I would like you to take any amount of money that is in the drawer to your right. Choosing the money is only contingent on you working on the task until time is up, not how you perform on this task. You may take any amount you prefer, all of it, none of it, or some quantity in between.)"

After 10-minutes had elapsed the experimenter interrupted over the intercom:

"All right time is up. (Please take any quantity of money you prefer from the money in the drawer.")

(3) Deprivation condition

Procedure was exactly the same except that all subjects were told that they are not receiving any money and that this was decided on a purely random basis. Subjects were reminded of this again after the completion of the first 10-minute time interval.

These instructions were given to all subjects with the minimum amount of deviation possible.

APPENDIX 3

RATING SCALES FOR INTRINSIC TASK INTEREST

INSTRUCTIONS

A. Pre-Treatment Instructions*

This is a study in cognitive learning that requires the measurement of feelings towards a task. This is done by having various people judge these tasks on a series of scales. In taking this test, please make sure your judgements are on the basis of *your feelings* about the task. On each of the following pages you will find a set of scales and you are to rate the task presented to you on each of the scales in their respective order. Here is how you are to use the scales:

If you feel the task is *very boring*, you should place your check mark as follows:

boring _X_:___:___:___:___:___:___: interesting

If you feel the task is *very interesting*, you should place your check mark as follows:

boring ___:___:___:___:___:___:_X_: interesting

If you feel the task is *fairly boring* or *fairly interesting*, you should place your check mark as follows:

boring ___:_X_:___:___:___:___:___: interesting

OR

boring ___:___:___:___:___:_X_:___: interesting

If you feel the task is only slightly boring or only slightly interesting, you should place your check mark as follows:

boring ___:___:_X_:___:___:___:___: interesting

OR

boring ___:___:___:___:_X_:___:___: interesting

If you consider the task to be neutral on the scale, or if the task is equally boring or interesting you should place you check mark in the middle space.

Please do not omit any item and never place more than one check mark in a single scale. Work at a fairly high speed throughout the questionnaire. It is your immediate impression, the immediate "feeling" about the task that we want. Thank you for your cooperation.

*Note: The headings A to F are for the benefit of the reader only and were not included on the questionnaires used in this study.

JIGSAW PUZZLE**

B. Semantic Differential Scales*

Good ___:___:___:___:___:___:___: Bad

Easy ___:___:___:___:___:___:___: Hard

Slow ___:___:___:___:___:___:___: Fast

Free ___:___:___:___:___:___:___: Constrained

Ordinary ___:___:___:___:___:___:___: Novel

Rational ___:___:___:___:___:___:___: Intuitive

Monotonous ___:___:___:___:___:___:___: Exciting

Passive ___:___:___:___:___:___:___: Active

Interesting ___:___:___:___:___:___:___: Boring

Ambiguous ___:___:___:___:___:___:___: Clear

Pleasurable ___:___:___:___:___:___:___: Painful

Simple ___:___:___:___:___:___:___: Complex

Rigied ___:___:___:___:___:___:___: Loose

Note: * Developed by Calder and Staw (1975)

** Titles appropriate for task

C. Pré-Treatment Summated Rating Scale

On the basis of your own impressions, rate the following questions as you did the first set:

1. To what extent do you find this task enjoyable?

JIGSAW PUZZLE

Very unenjoyable ___:___:___:___:___:___:___: Very enjoyable

2. To what extent do you find this task interesting?

Very uninteresting ___:___:___:___:___:___:___: Very interesting

D. Post-Treatment Instructions

Now that you have completed the experiment please rate the task again on the basis of your feelings towards the task. On each of the following pages you will find a set of scales and you are to rate the task presented to you on each of the scales in their respective order. Here is how you are to use the scales:

If you feel the task is very boring, you should place your check mark as follows:

boring _X_:___:___:___:___:___:___: interesting

If you feel the task is very interesting, you should place your check mark as follows:

boring ___:___:___:___:___:___:_X_: interesting

If you feel the task is fairly boring or fairly interesting, you should place your check mark as follows:

boring ___:_X_:___:___:___:___:___: interesting

OR

boring ___:___:___:___:___:_X_:___: interesting

If you feel the task is only slightly boring or only slightly interesting, you should place your check mark as follows:

boring ___:___:_X_:___:___:___:___: interesting

OR

boring ___:___:___:___:_X_:___:___: interesting

If you consider the task to be neutral on the scale, or if the task is equally boring or interesting you should place you check mark in the middle space.

E. Post-Treatment Rating Scales

Please rate the following questions as you did the first set:

1. To what extent do you find this task enjoyable?

JIGSAW PUZZLE

Very   Very
unenjoyable ___:___:___:___:___:___:___: enjoyable

2. To what extent do you find this task interesting?

Very   Very
uninteresting ___:___:___:___:___:___:___: interesting

3. To what extent did you work on the task because you found the task interesting and enjoyable?

Very   Not
much ___:___:___:___:___:___:___:___:___:___:___: at all

4. How much effort did you put forth working on the task?

Very   Very
much ___:___:___:___:___:___:___:___:___:___:___: little

5. Did the task seem like work or pleasure?

Work _______   Pleasure _______

6. Would you volunteer for another similar experiment?

Yes _______   No _______

F. Experimenter Pair Comparison Worksheet

Randomized Pairs

C-E

A-D

B-E

C-D

B-C A B C D E

A-C

B-D

D-E

A-B

A-E

Note :

A = Jigsaw Puzzle

B = Water Colour Painting

C = Crossword Puzzle

D = Block Design

E = Business Writing

APPENDIX 4

DATA SUMMARY TABLES OF STUDY 1

APPENDIX 4.1

ANOVA SUMMARY TABLE FOR FREE CHOICE TASK PERSISTENCE OF HIGH, LOW, AND NORM SAMPLE GROUPS

Source	df	MS	F	p
Between Groups	2	280887.50	5.78	p <.005
Within Groups	72	48602.05		

APPENDIX 4.2

PROBABILITY MATRIX OF SCHEFFE MULTIPLY COMPARISON OF TASK PERSISTENCE MEANS OF HIGH, LOW, AND NORM SAMPLE GROUPS

	HIGH	LOW	NORM
MEANS	454.65 S.D.=202.64	253.83 S.D.=236.48	305.14 S.D.=220.96
HIGH	----	.01	.06
LOW	----	---	.71

APPENDIX 4.3

ANOVA WITH REPEATED MEASURES SUMMARY TABLE
FOR FREE-CHOICE TASK PERSISTENCE DATA:
2(GROUPS) x 2(REPEATED MEASURES FOR RATERS)

Source	df	MS	F	T
Between Subjects Motivation (A)	1	1013701.20	10.528	p <.005
Subjects Within Groups	48	96289.10		
Within Subjects Rater (B)	1	253.90	0.868	p <.25
Motivation x Rater (A x B)	1	332.00	1.135	p <.25
B x Subject Within Groups	48	292.60		

APPENDIX 4.4

TASK DISTRIBUTION WITHIN HIGH AND LOW TASK MOTIVATION GROUPS

	HIGH	LOW
JIGSAW PUZZLE	5	4
WATER COLOUR PAINTING	4	6
CROSSWORD PUZZLE	5	5
BLOCK DESIGN	6	3
BUSINESS WRITING	5	7

APPENDIX 4.5

SIGNIFICANT MOTIVATION LEVEL DIFFERENCES

Group	High Task Interest		Low Task Interest	
	Rater 1	Rater 2	Rater 1	Rater 2
Mean	454.45	454.80	256.67	249.90
Standard Deviation	248.07	247.53	172.45	171.00

APPENDIX 4.6

CORRELATION MATRIX OF INTRINSIC TASK INTEREST MEASURES (N=50)

Intrinsic Task Interest Tests	TP	SDAP	SDBP	SDCP	SDAPO	SPBPO	SDCPO	SRATP	SRATPO	CRS	ES	W/P	VOL
1. Task Persistance		284*	272	004	279	249	101	301	230	016	070	0	0
2. Semantic Differential (Affective, Pre-Test)			428	-129	855**	420**	234	774	605**	161	053	0	0
3. Semantic Differential (Behavorial, Pre-Test)				161	483	729	154	445	366	167	091	0	0
4. Semantic Differential (Cognitive, Pre-Test)					-104	049	413	113	198	318	363*	0	0
5. Semantic Differential (Affective, Post-Test)						431**	218	764**	679**	200	124	0	0
6. Semantic Differential (Behavioral, Post-Test)							320*	320*	190	-113	-181	0	0
7. Semantic Differential (Cognitive, Post-Test)								260	149	079	158	0	0
8. Summated Rating Scale (Pre-Test)									759**	365*	263	0	0
9. Summated Rating Scale (Post-Test)										415*	406**	0	0
10. Combined Rating Scale (Post-Rating Only)											394**	0	0
11. Effort Scale (Post-Rating Only)												0	0
12. Work-Pleasure Question (Post-Rating Only)													0
13. Volunteer Question (Post-Rating Only)													

Note: *p <.05
**p <.01
Decimal point omited

APPENDIX 4.7

FACTOR ANALYSIS OF INTRINSIC TASK INTEREST TEST SCORES (N= 50)

A VARIMAX ROATION

Test	I Rated Task Interest	II Post Treatment	III Behavioral	IV Cognitive	h^2
1. Task Persistance	293	-158	289	095	204
2. Semantic Differential (Affective Pre-Test)	866	047	277	037	830
3. Semantic Differential (Behavioral Pre-Test)	342	143	786	-140	774
4. Semantic Differential (Cognitive Pre-Test)	-251	725	300	332	789
5. Semantic Differential (Affective Post-Test)	880	010	276	-011	851
6. Semantic Differential (Behavioral Post-Test)	240	-176	881	055	868
7. Semantic Differential (Cognitive Post-Test)	040	259	448	599	629
8. Summated Rating Scale (Pre-Test)	848	260	198	103	837
9. Summated Rating Scale (Post-Test)	789	405	043	134	807
10. Combined Rating Scale (Post-Rating Only)	294	699	-130	-024	593
11. Effort Scale (Post-Rating Only)	146	785	-093	-087	653
12. Work-Pleasure Question (Post-Rating Only)	333	121	037	473	350
13. Volunteer Question (Post-Rating Only)	-075	-204	-189	831	774
Variance	3.416	2.065	2.024	1.453	
% of Total Variance	26.279%	15.881%	15.566%	11.178%	-

Note: Decimal point omited

APPENDIX 5

DATA SUMMARY TABLES OF STUDY 2

APPENDIX 5.1

ANOVA SUMMARY TABLE FOR AFFECTIVE SEMANTIC DIFFERENTIAL DATA: 4 (GROUPS) x 2 (LEVELS)

Source	df	MS	F	P
Order (A)	3	6.914	7.11	$p < 0.001$
Motivation Level (B)	1	59.097	60.79	$p < 0.001$
Order x Motivation (A x B)	1	5.412	5.56	$p < 0.005$
Within Order-Motivation Groups	56	0.972		

APPENDIX 5.2

ANOVA SUMMARY TABLE FOR BEHAVIORAL SEMANTIC DIFFERENTIAL DATA: 4(GROUPS) x 2(LEVELS)

Source	df	MS	F	P
Order (A)	3	1.293	1.63	$p < 0.05$
Motivation Level (B)	1	14.822	18.78	$p < .001$
Order x Motivation Level(A x B)	3	2.117	2.68	$p < .05$
Within Order-Motivation Groups	56	0.789		

APPENDIX 5.3

ANOVA SUMMARY TABLE FOR COGNITIVE SEMANTIC DIFFERENTIAL DATA: 4(GROUPS) x 2(LEVELS)

Source	df	MS	F	P
Order (A)	3	0.375	1.098	p <.25
Motivation Level (B)	1	3.900	11.401	p <.005
Order x Motivation Level (A x B)	3	0.137	0.401	p <.75
Within Order-Motivation Groups	56	0.342		

APPENDIX 5.4

ANOVA SUMMARY TABLE FOR SUMMATED RATING SCALE

DATA: 4 (GROUPS) x 2 (LEVELS)

Source	df	MS	F	P
Order (A)	3	3.316	2.058	$p < .05$
Motivation Level (B)	1	41.441	25.719	$p < .001$
Order x Motivation Level (A x B)	3	2.014	1.250	$p < .25$
Within Order-Motivation Level Groups	56	1.611		

APPENDIX 5.5

SUMMARY OF SCHEFFE A POSTERIORI COMPARISONS OF MEANS FOR SEMANTIC DIFFERENTIAL AFFECTIVE AND BEHAVIOR SCALES

Test	Comparisons	High Task Motivation	Low Task Motivation
		df(1,56) F	df(1,56) F
S.D. (Affective)	A1A2	2.69	1.42
	A1A3	0.60	45.42*
	A1A4	0.06	0.37
	A2A3	0.74	30.77*
	A2A4	1.92	3.25
	A3A4	0.28	54.02*
S.D. (Behavioral)	A1A2	3.60	3.97
	A1A3	1.85	4.90
	A1A4	1.23	0.73
	A2A3	10.61*	0.05
	A2A4	0.63	8.10*
	A3A4	6.08	9.41*

Note: * $p < .05$
A1 = Test-Performance-Test
A2 = Test Test
A3 = Performance-Test
A4 = Test

APPENDIX 5.6

SUMMARY TABLE OF MEAN AND STANDARD DEVIATIONS OF SIGNIFICANT TEST-PERFORMANCE-RE-TEST DIFFERENCES

TEST	SEMANTIC DIFFERENTIAL (AFFECTIVE)		SEMANTIC DIFFERENTIAL (BEHAVIORAL)
A1	2.69 (S.D.=.41)	A2	4.94 (S.D.=.33) *
A3	5.12 (S.D.=.32)	A3	3.91 (S.D.=.24) *
A2	3.87 (S.D.=.28)	A2	3.87 (S.D.=.28)
A3	5.12 (S.D.=.10)	A4	2.97 (S.D.=.36)
A3	5.12 (S.D.=.10)	A3	5.12 (S.D.=.32)
A4	2.47 (S.D.=.13)	A4	2.97 (S.D.=.36)

Note: * Low Task Motivation

A1 = Test-Performance-Re-Test

A2 = Test Re-Test

A3 = Performance-Re-Test

A4 = Re-Test

APPENDIX 5.7

ANOVA SUMMARY TABLE FREE-TIME TASK
PERSISTENCE DATA: 2(GROUPS) x 2(LEVELS)

Source	df	MS	F	P
Order (A)	1	52600.244	1.538	p <.05
Motivation Level (B)	1	787849.219	23.029	p <.001
Order x Motivation Level (A x B)	1	35617.139	1.041	p <.25
Order-Motivation Within Groups	28	34209.692		

APPENDIX 5.8

MEANS AND STANDARD DEVIATIONS ON TASK PERSISTENCE OF TEST-PERFORMANCE-TEST AND PERFORMANCE ONLY DATA IN SECONDS

Group	High Task Interest		Low Task Interest	
	Mean	S.D.	Mean	S.D.
Test-Performance-Test	534.35	164.10	153.81	124.00
Performance-Test	386.54	196.96	139.44	182.74

APPENDIX 6

SUMMARY ANCOVA TABLES OF ATTITUDE MEASURES OF INTRINSIC MOTIVATION

APPENDIX 6.1

SUMMARY ANCOVA TABLE FOR SEMANTIC DIFFERENTIAL AFFECTIVE DATA: 2(GROUPS) x 5(LEVELS)

Source	df	MS	F	p
Motivation Level (A)	1	0.593	0.642	p >.25
Reward Condition (B)	4	2.367	2.562	p <.05
Motivation x Reward (AxB)	4	1.277	1.382	p >.05
Motivation-Reward Within Groups	130	0.924		

APPENDIX 6.2

SUMMARY ANCOVA TABLE FOR SEMANTIC DIFFERENTIAL BEHAVIORAL DATA: 2(GROUPS) x 5(LEVELS)

Source	df	MS	F	p
Motivation Level (A)	1	3.489	5.832	p >.05
Reward Condition (B)	4	1.003	1.677	p <.05
Motivation x Reward (AxB)	4	0.884	1.478	p >.05
Motivation-Reward Within Groups	130	0.598		

APPENDIX 6.3

SUMMARY ANCOVA TABLE FOR SEMANTIC DIFFERENTIAL COGNITIVE DATA: 2(GROUPS) x 5(LEVELS)

Source	df	MS	F	p
Motivation Level (A)	1	3.489	5.833	p >.05
Reward Condition (B)	4	1.003	1.677	p <.05
Motivation x Reward (AxB)	4	0.884	1.478	p >.05
Motivation-Reward Within Groups	130	0.598		

APPENDIX 6.4

SUMMARY ANCOVA TABLE FOR SUMMATED-RATING SCALE

DATA: 2 (GROUPS) x 5 (LEVELS)

Source	df	MS	F	p
Motivation Level (A)	1	0.051	0.029	p >.75
Reward Condition (B)	4	4.829	2.812	p <.05
Motivation x Reward (AxB)	4	0.843	0.491	p >.50
Motivation-Reward Within Groups	130	1.717		

APPENDIX 6.5

SUMMARY ANCOVA TABLE FOR POST-RATING SCALE DATA: 2 (GROUPS) x 5 (LEVELS)

Source	df	MS	F	p
Motivation Level (A)	1	1.116	0.489	p >.25
Reward Condition (B)	4	3.399	1.490	p <.05
Motivation x Reward (AxB)	4	4.694	2.059	p >.05
Motivation-Reward Within Groups	130	2.280		

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APPENDIX 6.6

SUMMARY ANCOVA TABLE FOR POST-EFFORT RATING SCALE DATA:2(GROUPS) x 5(LEVELS)

Source	df	MS	F	P
Motivation Level (A)	1	0.178	0.061	p >.75
Reward Condition (B)	4	2.002	0.682	p <.50
Motivation x Reward (AxB)	4	0.749	0.255	p >.75
Motivation-Reward Within Groups	130	2.937		

APPENDIX 6.7

CORRELATION MATRIX OF INTRINSIC INTEREST MEASURES (N=144)

Intrinsic Task Interests Tests	TP	SDAP	SDBP	SDCP	SDAPO	SFBPO	SDCPO	SRATP	SRATPO	CRS	ES	W/P	VOL
1. Task Persistance		227*	098	071	187	-005	046	116	133	205	167*	046	160
2. Semantic Differential (Affective, Pre-Test)			334**	193*	747**	246**	176*	670**	500**	410**	148**	272**	040
3. Semantic Differential (Behaviorial, Pre-Test)				016	377**	712**	011	205*	253**	290**	072	295**	-132
4. Semantic Differential (Cognitive, Pre-Test)					081	022	359**	198*	155	244**	156	035	096
5. Semantic Differential (Affective, Post-Test)						273**	189*	595**	717**	579**	297**	460**	123
6. Semantic Differential Behavioral, Post-Test)							069	110	155	117	-143	225**	-120
7. Semantic Differential (Cognitive, Post-Test)								187*	137	099	075	114	116
8. Summated Rating Scale (Pre-Test)									571**	326**	248**	214*	118
9. Summated Rating Scale (Post-Test)										595**	458**	449**	198*
10. Combined Rating Scale (Post-Rating Only)											438**	430**	174*
11. Effort Scale (Post-Rating Only)												128	139
12. Work-Pleasure Question (Post-Rating Only)													169
13. Volunteer Question (Post-Rating Only)													

Note: $^{*}p<.05$

$^{**}p<.01$

Decimal point omited

APPENDIX 6.8

FACTOR ANALYSIS OF INTRINSIC TASK INTEREST TEST SCORES (N=144)

A VARIMAX ROATION

Test	I Rated Task Interest	II Post Treatment	III Behavioral	IV Cognitive	h^2
1. Task Persistance	105	352	224	080	141
2. Semantic Differential (Affective, Pre-Test)	846	174	206	142	785
3. Semantic Differential (Behavioral, Pre-Test)	214	033	855	-021	779
4. Semantic Differential (Cognitive, Pre-Test)	126	104	-044	801	671
5. Semantic Differential (Affective, Post-Test)	767	368	301	011	814
6. Semantic Differential (Behavioral, Post-Test)	088	-130	894	083	830
7. Semantic Differential (Cognitive Post-Test)	082	094	071	793	649
8. Summated Rating Scale (Pre-Test)	850	097	-003	153	755
9. Summated Rating Scale (Post-Test)	640	549	153	002	734
10. Combined Rajing Scale (Post-Rating Only)	387	661	226	060	641
11. Effort Scale (Post-Rating Only)	273	597	-179	001	463
12. Work-Pleasure Question (Post-Rating Only)	153	.550	461	-109	550
13. Volunteer Question (Post-Rating Only)	-142	639	-142	181	481
Variance	2.792	2.117	2.009	1.376	
% of Total Variance	21.478%	16.283%	15.453%	10.584%	

Note: Decimal point omited

APPENDIX 7

POST HOC ANALYSIS OF MONEY CHOICE VERSUS NO-MONEY CHOICE GROUPS DATA

APPENDIX 7.1

Another two-factor analysis of covariance was conducted on the task persistence data and the self-report measures of intrinsic task interest across two levels of motivation. This analysis was conducted to test the effects of subject's taking money or not taking money (A). Appendix 7.2 presents the F values of main and interaction effects. Both motivation level main effects (B) and the money, no-money, and control main effects (A) were significant. The interaction effect was not significant. Scheffe a posteriori test was conducted to test differences between individual group means within both motivation levels (B). A number of interesting significant results were revealed: (1) Both the money and no-money groups were significantly lower in task persistance than the high motivation controls, (2) within the low motivation level, however, only the money group mean was significantly lower than the control group mean, (3) the money group means were significantly lower in task persistance than the no-money group means in both low and high task motivation conditions, and finally, (4) there was a strong and significant Money x Motivation level interaction effect; F(df=2,84)=49.60, p <.001. Appendix 7.3 and 7.4 provides the F values for all Scheffe tests. Appendic 7.5 provides the means and standard deviations for the groups.

APPENDIX 7.2

SUMMARY ANCOVA TABLE FOR TASK PERSISTENCE

DATA OF MONEY CHOICE VS-NO-MONEY

CHOICE GROUPS: 2 (GROUPS) x 2 (LEVELS)

Source	df	MS	F	p
Choice Level (A)	1	252381.875	7.004	p >.05
Motivation Level (B)	2	336098.005	9.327	p <.001
Choice x Motivation (AxB)	2	12567.746	0.349	p >.50
Choice-Motivation Within Groups	62	360.016		

APPENDIX 7.3

SUMMARY TABLE OF SCHEFFE A POSTERIORI COMPARISONS OF INDIVIDUAL TASK PERSISTENCE MEANS

Comparisons	High Task Motivation F	Low Task Motivation F
B1B2	13.63*(df=2,42)	7.80*(df=2,36)
B1B3	5.19*(df=2,69)	0.13(df=2,60)
B2B3	42.28*(df=2,69)	14.38*(df=2,60)

Note: *p <.05

B1 = No-$ Choice

B2 = $ Choice

B3 = Control

APPENDIX 7.4

SUMMARY TABLE OF SCHEFFE A POSTERIORI COMPARISONS OF INDIVIDUAL TASK PERSISTENCE MEANS ACROSS MOTIVATION LEVEL.

Comparison	No-Money Choice	$-Choice
A1A2	7.13*(df=1,44)	2.92(df=1,42)

Note: *p <.05

A1 = High Task Motivation Groups

A2 = Low Task Motivation Groups

MEANS AND STANDARD DEVIATIONS OF REWARD

CHOICE AND CONTROL GROUPS FOR TASK PERSISTENCE IN SECONDS

Reward	High Task Motivation		Low Task Motivation	
	Mean	S.D	Mean	S.D
Choice ($)	178.59	137.36	86.47	121.25
Choice (No-$)	421.41	239.91	277.56	244.59
Control	543.70	103.51	299.38	242.83